United States Department of Agriculture

Soil Conservation Service

In cooperation with Illinois Agricultural Experiment Station

Soil Survey of Brown County, Illinois

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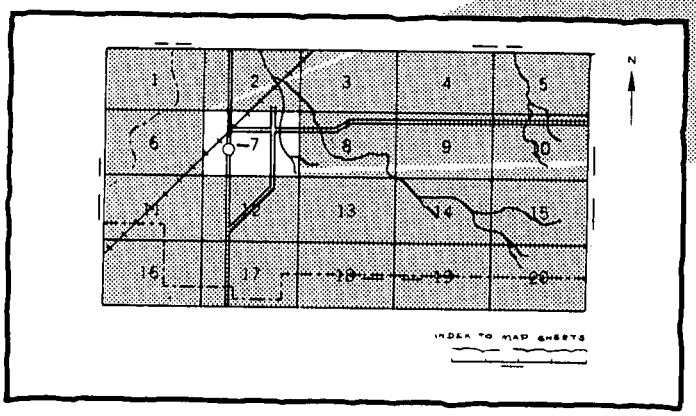

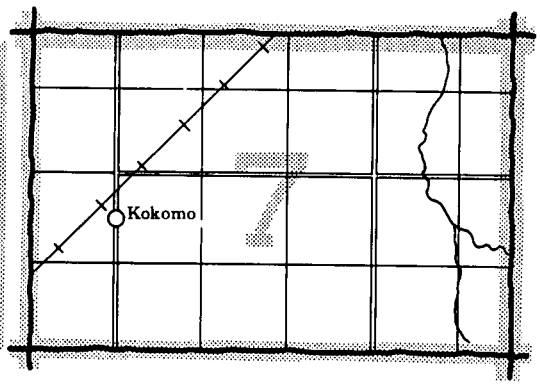

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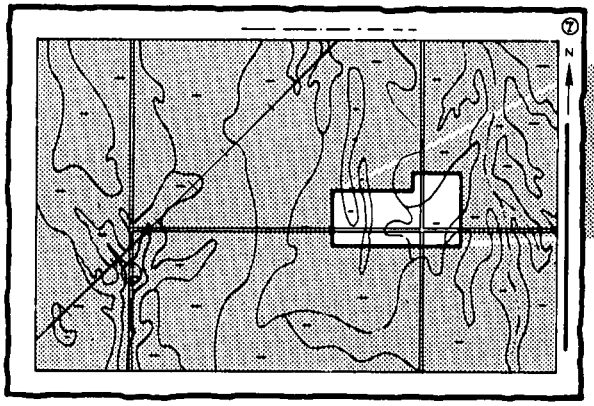

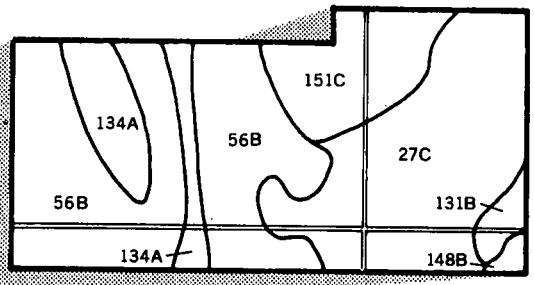

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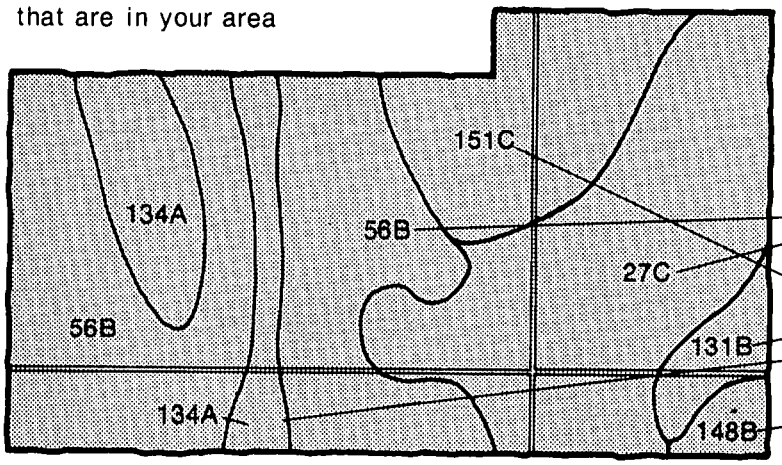

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THIS SOIL SURVEY

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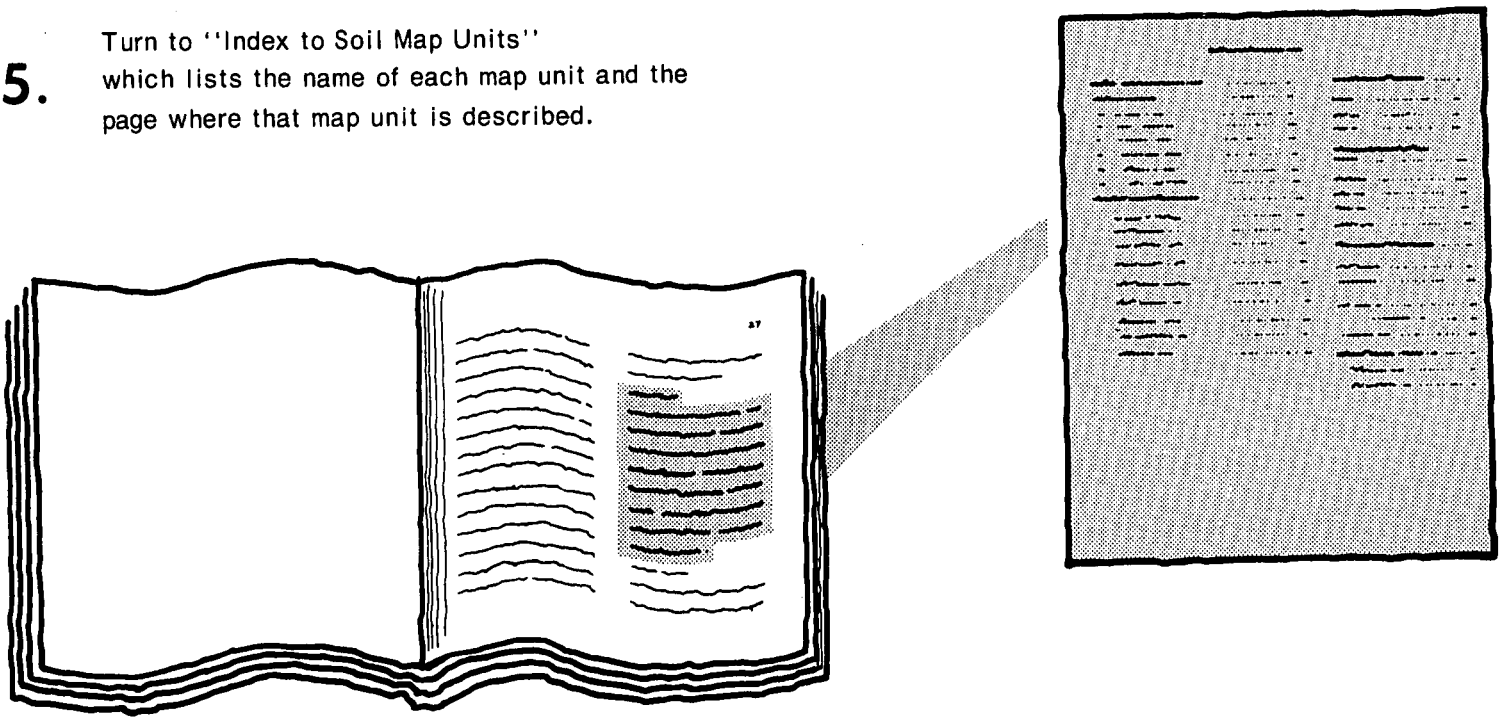
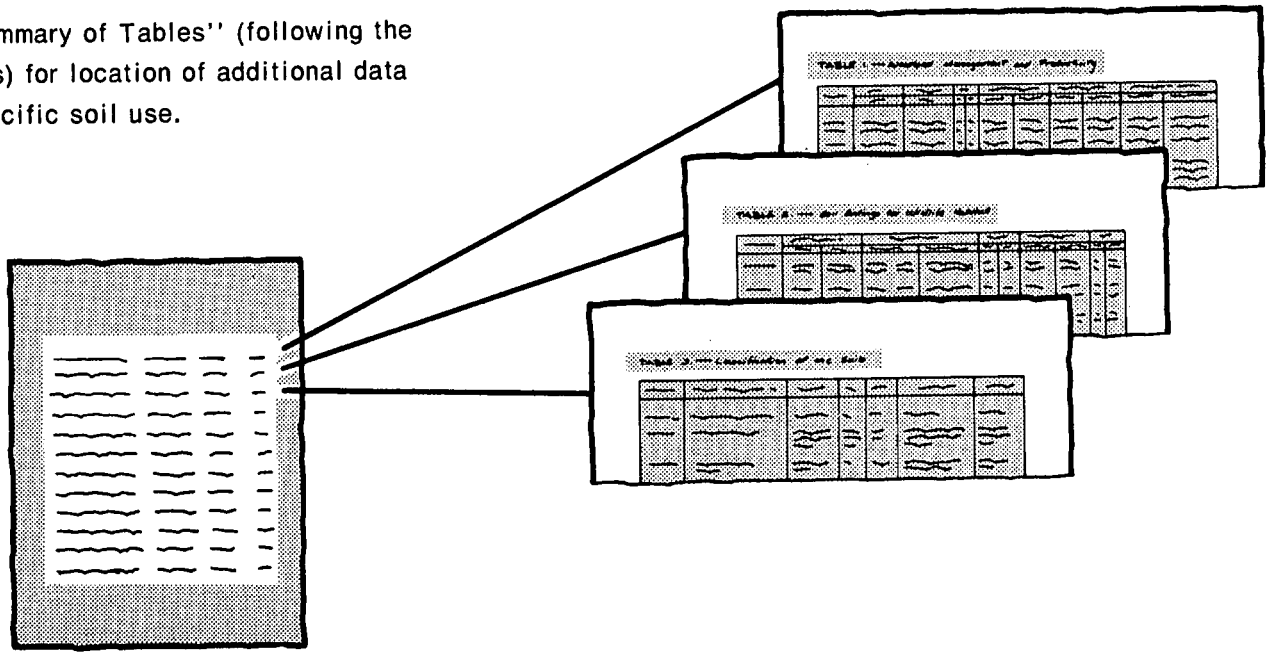


6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, handicap, or age.

Major fieldwork for this soil survey was completed in 1982. Soil names and descriptions were approved in 1983. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This survey was made cooperatively by the Soil Conservation Service and the Illinois Agricultural Experiment Station. The cost was shared by the Brown County Board. The survey is part of the technical assistance furnished to the Brown County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

This soil survey is Illinois Agricultural Experiment Station Soils Report No. 124.

Cover: Structure No. 1 in the Hambaugh-Martin Watershed. This structure and others like it in drainageways on the bluffs along the Illinois River reduce sediment damage on the fertile bottom land.

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Foreword

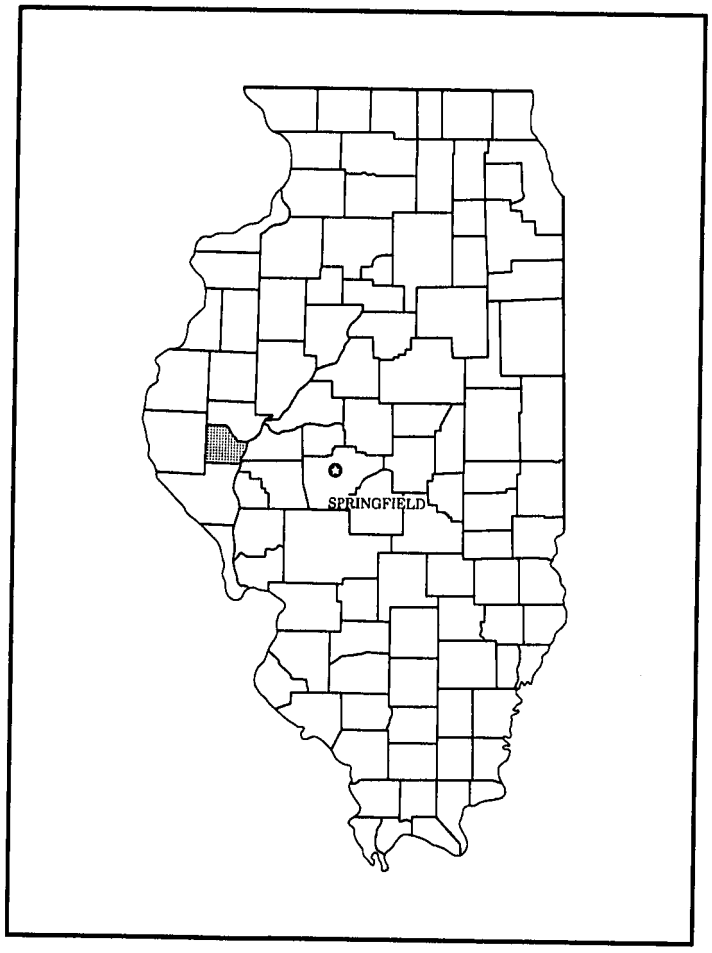
This soil survey contains information that can be used in land-planning programs in Brown County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

John J. Eckes
State Conservationist
Soil Conservation Service



Location of Brown County in Illinois.

Soil Survey of Brown County, Illinois

By G.V. Berning, Soil Conservation Service

Soils surveyed by G.V. Berning and L.J. Bushue,
Soil Conservation Service, and B.J. Cate, Brown County

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
the Illinois Agricultural Experiment Station

General Nature of the County

BROWN COUNTY is in the west-central part of Illinois. It has an area of 197,120 acres, or about 308 square miles. It is bordered on the north by Schuyler County, on the east by Cass and Morgan Counties, on the south by Pike County, and on the west by Adams County. In 1978 the population of Brown County was 5,309. Mt. Sterling, the county seat, had a population of 2,074 (*11*).

The following sections provide general information about some of the natural and cultural factors that affect land use in Brown County.

Climate

Peter Vinzani, weather observer with the State Water Survey Division of the Illinois Institute of Natural Resources, assisted with the preparation of this section.

Brown County has a continental climate of relatively cold winters and warm, humid summers. Although precipitation is heaviest during the warmer half of the year, winter snow cover and frost usually provide adequate moisture to the soil in spring.

This area usually experiences one or two severe winter storms each year, with heavy snow accumulations and blowing snow. Severe thunderstorms, hail, and tornadoes are frequent during mid-to-late spring.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Griggsville in the period 1951 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 29.2 degrees F, and the average daily minimum temperature is 20.2 degrees. The lowest temperature on record, which occurred at Griggsville on January 23, 1963, is -14 degrees. In summer the average temperature is 74.8 degrees, and the average daily maximum temperature is 85.9 degrees. The highest recorded temperature, which occurred at Griggsville on July 14, 1954, is 115 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (55 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 36.37 inches. Of this, 23.63 inches, or nearly 65 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 12.88 inches. The heaviest 1-day rainfall during the period of record was 5.02 inches at Griggsville on September 16, 1965. Thunderstorms occur on about 50 days each year, and most occur in the spring. The average seasonal snowfall is 24.1 inches.

History and Development

Brown County was established on February 1, 1839, by legislation which separated it from Schuyler County. Originally, the area was part of St. Clair County of the Indiana Territory. After the establishment of the Illinois

Territory, what is now Brown County was part of Madison County until after Illinois gained statehood.

Much of the settlement of the area began in the mid-1820's and continued until the population reached a peak of 13,041 during the 1880's. Brown County was named after Jacob Brown, a general during the War of 1812. The settlers in Brown County were mainly from Kentucky, Tennessee, Virginia, and North Carolina. The county seat, Mount Sterling, and the village of Versailles were both named after towns in eastern Kentucky.

Farming and Industry

Agriculture is the major industry in the county, and most of the other industries are directly or indirectly related to agriculture. According to the 1978 Census of Agriculture, 165,326 acres in Brown County was in 585 farms (*11*). Brown County is following state and national trends toward fewer but larger farms.

In 1980, crops covered 90,700 acres, or about 46 percent of the county. Of the total crop acreage, 43 percent was used for corn, 39 percent for soybeans, 8 percent for wheat, and 10 percent for hay. The sale of livestock accounts for about 54 percent of the county's agricultural cash receipts. Crops account for 45 percent and forest products for about 1 percent (*6*). Hog production is the major livestock industry followed by beef production and a small poultry-producing industry. The economic trend has been toward a larger percentage of cash receipts from crops and a smaller percentage from livestock.

Relief, Physiography, and Drainage

The topography of Brown County is rugged, by Illinois standards, in all but the west-central part, where slopes level to form a rich fertile upland plain. The soils on uplands near the Illinois River are primarily derived from thick deposits of windblown silts. In other parts of the county, water has dissected the topography, exposing glacial drift and shale residuum. Near the Illinois River, silty and clayey materials deposited by water form a flood plain extending as much as 3 to 4 miles from river to bluff.

Brown County is drained by two rivers, the LaMoine and Illinois, which are the eastern border of the county. The Illinois River forms about 12 miles of the county's border and drains the southeastern part of the county via Baehr, Little, Camp, and Martin Creeks. The Illinois River is navigable, and the LaGrange lock and dam help to maintain a channel for year-around barge traffic. The LaMoine River forms about 22 miles of the county's border and flows into the Illinois River. The LaMoine River drains the northern half of the county via Shelby, Logan, West, Little Missouri, and Missouri Creeks. The rest of the county is drained by about 27 miles of McKee Creek and its tributaries, Wells, Purpus, Doby, Dry Fork, and Leineke Creeks. Most of the creeks in the county are clear and have sand, gravel, or rock bottoms.

Transportation Facilities and Natural Resources

The three major highways in the county are U.S. Route 24, which runs east and west, and State Highways 99 and 107, which run north and south. All three pass through Mount Sterling. Although barges use the Illinois River, no barge docking facilities are in the county.

Soil supports the county's main industry, agriculture. The other major resources are timber and deposits of sand, gravel, limestone, potter's clay, and coal. Several oil and gas wells are in the county.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of

rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soil on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, an association consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Because of the differences in the extent of the major soils, the names of the associations on the general soil map of this county do not completely agree with those

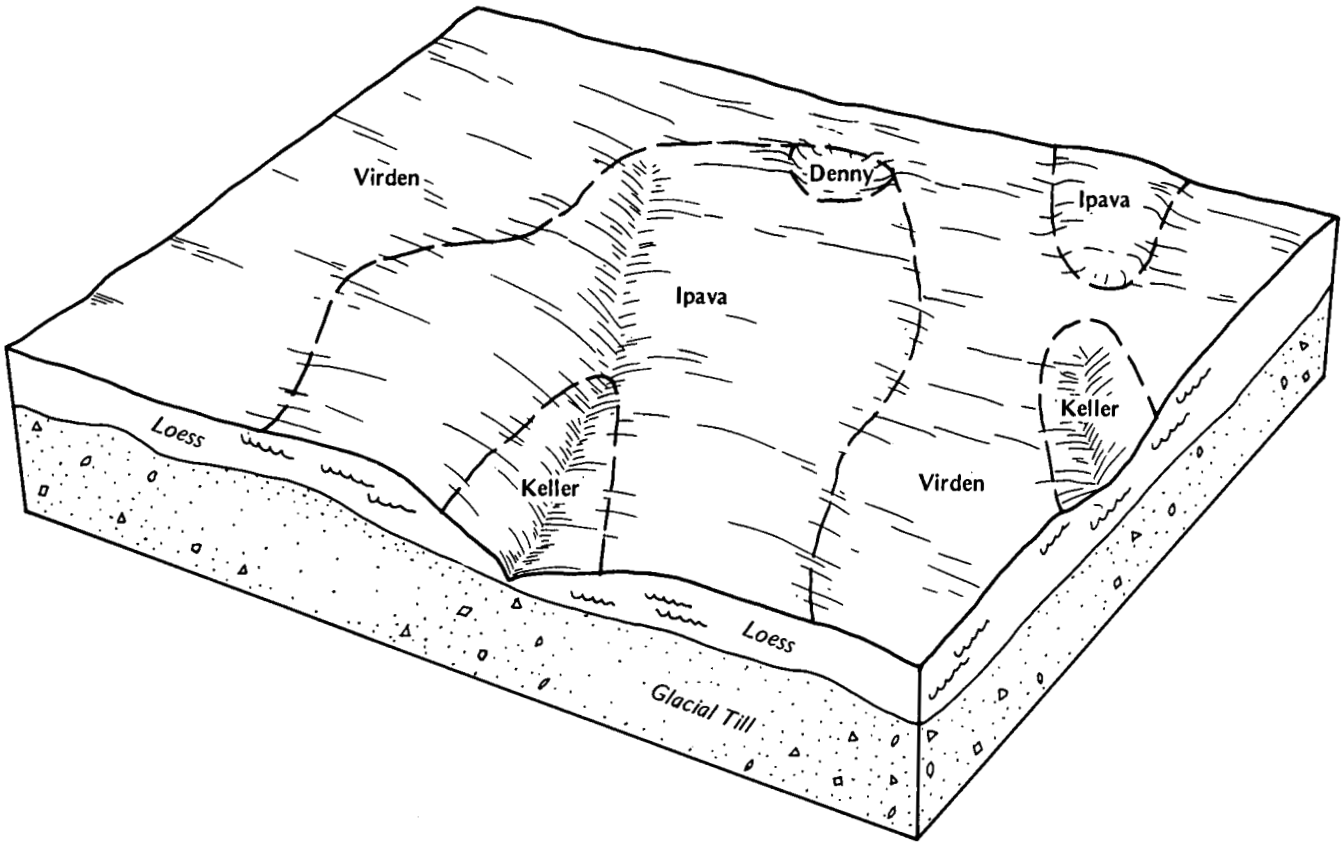


Figure 1.—Typical pattern of soils and parent material in the Ipava-Virden association.

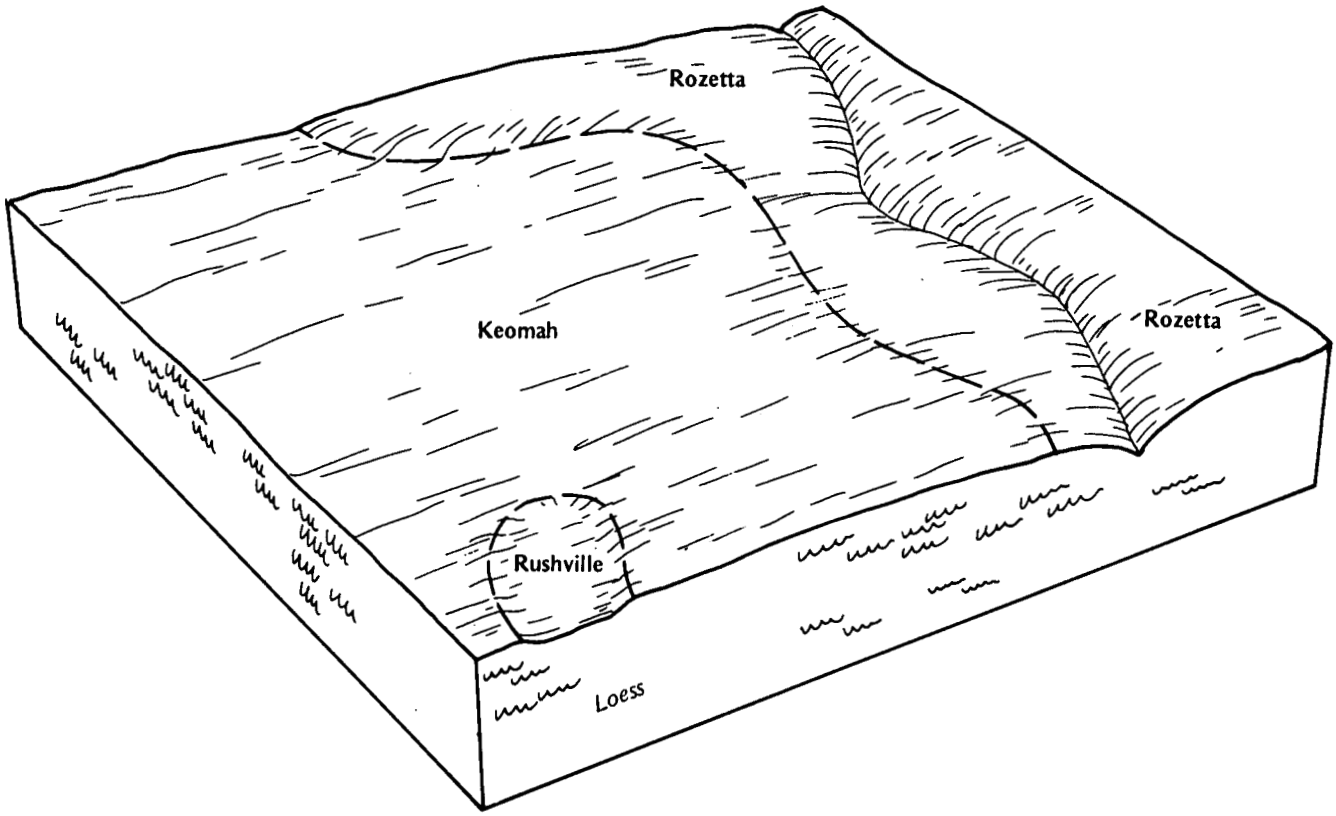


Figure 2.—Typical pattern of soils and parent material in the Keomah-Rozetta association.

on the general soil map of adjacent Adams County. Because the soils are similar, however, these differences do not significantly affect the use of the map for general planning of land uses.

Soil Descriptions

1. Ipava-Virden Association

Nearly level and gently sloping, somewhat poorly drained and poorly drained soils formed in loess; on uplands

This association consists of broad plains, ridgetops, upland flats, depressions, and shallow upland drainageways. Slopes range from 0 to 5 percent.

This association makes up about 10 percent of the county. The association is about 50 percent Ipava soils and similar soils, 40 percent Virden soils, and 10 percent minor soils (fig. 1).

The nearly level and gently sloping, somewhat poorly drained, moderately slowly permeable Ipava soils are on upland divides. They are on slight rises above Virden soils and along drainageways. Typically, the surface layer is black, friable silt loam about 14 inches thick. The subsoil is firm silty clay loam about 40 inches thick. The upper part of the subsoil is very dark gray. The middle part is grayish brown and mottled. The lower part is light brownish gray and mottled. The underlying material is light brownish gray, mottled, friable silt loam to a depth of 60 inches or more.

The Virden soils are nearly level, poorly drained, and moderately slowly permeable. They are in low areas on upland divides. Typically, the surface soil is black, friable silty clay loam about 14 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is very dark gray and olive gray, firm silty clay loam. The next part is gray, friable silty clay loam. The lower part is gray, friable silt loam.

The minor soils in this association are somewhat poorly drained Keller soils and poorly drained Denny soils. The Keller soils are on the steeper slopes along drainageways. The Denny soils are in shallow depressions, some of which are ponded for brief periods.

Most of this association is used for cultivated crops. The soils are well suited to corn, soybeans, and small

grain. Organic matter content and available water capacity are high. The main management need is drainage.

2. Keomah-Rozetta Association

Nearly level to sloping, somewhat poorly drained and moderately well drained soils formed in loess; on uplands

This association consists mainly of ridgetops and side slopes of shallow drainageways. Closed depressions are in some nearly level areas. Slopes range from 0 to 10 percent.

This association makes up about 20 percent of the county. The association is about 55 percent Keomah soils and similar soils, 35 percent Rozetta soils, and 10 percent minor soils (fig. 2).

The Keomah soils are nearly level and gently sloping, somewhat poorly drained, and moderately slowly permeable. They are on ridgetops. Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 3 inches thick. The subsoil is mottled and is about 47 inches thick. The upper part of the subsoil is brown, firm silty clay loam. The middle part is brown, very firm silty clay. The lower part is grayish brown and light olive gray, firm silty clay loam. The underlying material is light brownish gray, friable silt loam to a depth of 60 inches or more.

The Rozetta soils nearly level to sloping, moderately well drained, and moderately permeable. They are on ridgetops near the Keomah soils and on side slopes below the Keomah soils. Typically, the surface layer is brown, friable silt loam or silty clay loam about 7 inches thick. The subsurface layer is brown, friable silt loam about 2 inches thick. The subsoil is yellowish brown, firm silty clay loam to a depth of 60 inches or more. It is mottled below a depth of about 26 inches.

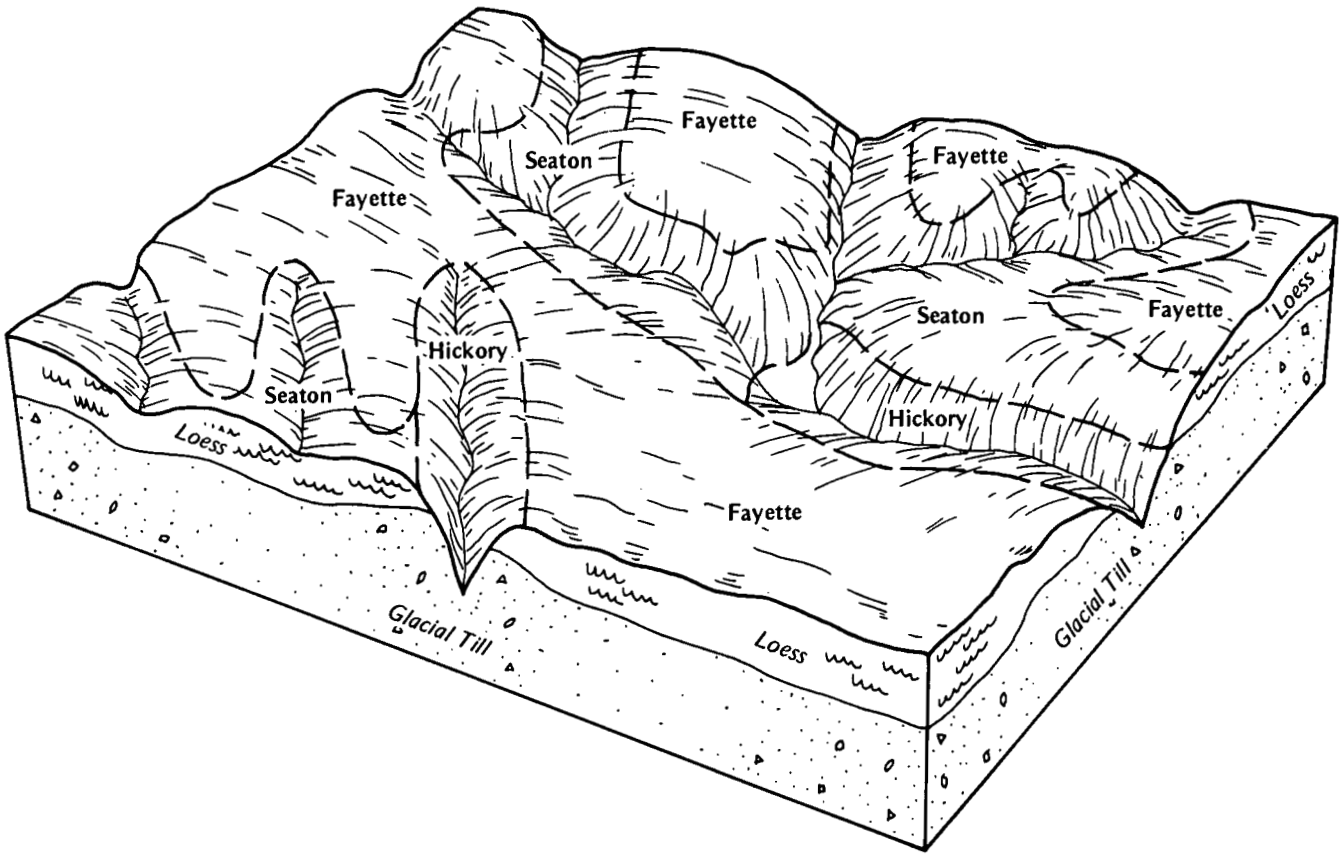


Figure 3.—Typical pattern of soils and parent material in the Fayette-Seaton-Hickory association.

The minor soils in this association are somewhat poorly drained Fishhook soils and poorly drained Rushville soils. The Fishhook soils are sloping and are along drainageways. The Rushville soils are in shallow depressions, some of which are ponded for brief periods.

Most of this association is used for cultivated crops. Many of the steeper areas, however, are used for hay or pasture. The Keomah soils are well suited to corn, soybeans, and small grain. The nearly level and gently sloping Rozetta soils are well suited to cultivated crops. The uneroded sloping Rozetta soils are moderately suited to cultivated crops and well suited to hay and pasture. The severely eroded sloping Rozetta soils are poorly suited to cultivated crops and moderately suited to hay and pasture. Organic matter content is mainly moderately low in the Keomah and Rozetta soils. Where the Rozetta soils are severely eroded, organic matter content is low. Available water capacity is mainly high, but it is very high in the sloping Rozetta soils. The main management need is drainage in the Keomah soils. Measures that control erosion and maintain tilth also are needed.

3. Fayette-Seaton-Hickory Association

Gently sloping to steep, well drained soils formed in loess or loess and glacial till; on uplands

This association consists of narrow ridges and drainageways. The ridgetops generally are gently sloping or sloping and the side slopes of the drainageways are moderately steep and steep. Outcrops of limestone and sandstone are on the steeper slopes along major waterways. Slopes range from 2 to 50 percent.

This association makes up about 14 percent of the county. The association is about 45 percent Fayette soils, 35 percent Seaton soils, 15 percent Hickory soils, and 5 percent minor soils (fig. 3).

The Fayette soils are gently sloping to strongly sloping and are moderately permeable. They are on ridgetops and side slopes above Seaton and Hickory soils. Typically, the surface layer is mixed brown and dark yellowish brown, friable silt loam or silty clay loam about 7 inches thick. The subsoil is dark yellowish brown and friable and is about 45 inches thick. The upper part is silty clay loam, and the lower part is silt loam. The underlying material is dark yellowish brown, friable silt loam to a depth of 60 inches or more.

The Seaton soils are moderately steep and steep and are moderately permeable. They are on side slopes below Fayette soils. Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is dark yellowish brown, friable silt loam about 3 inches thick. The subsoil is friable silt loam that extends to a depth of 60 inches or more. The upper part is yellowish brown, and the lower part is dark yellowish brown.

The Hickory soils are moderately steep and steep and are moderately permeable. They are on side slopes near or below Seaton soils. Typically, the surface layer is brown, friable loam about 2 inches thick. The subsurface layer is brown, friable loam about 3 inches thick. The subsoil is firm and is about 52 inches thick. The upper part is yellowish brown clay loam, and the lower part is yellowish brown loam. The underlying material is yellowish brown, firm loam to a depth of 60 inches or more.

The minor soils in this association are somewhat excessively drained, steep Hamburg soils near the Illinois River.

Most of this association is used for woodland. Some areas are used for hay and pasture. Some of the less sloping areas are used for cultivated crops. All soils in this association are well suited to woodland. The gently sloping to strongly sloping areas are well suited to pasture and hay, and the moderately steep and steep areas are moderately suited. The gently sloping to strongly sloping areas are suited to corn, soybeans, and small grain. The main management need is erosion control.

4. Fayette-Sylvan Association

Gently sloping to strongly sloping, well drained soils formed in loess; on uplands

This association consists of incised uplands marked by mainly gently sloping areas between the drainageways. Some nearly level areas are between the drainageways. Slopes range from 2 to 15 percent.

This association makes up about 7 percent of the county. The association is about 50 percent Fayette soils, 30 percent Sylvan soils, and 20 percent minor soils (fig. 4).

The Fayette soils are gently sloping to strongly sloping and are moderately permeable. They are on ridgetops and side slopes. Typically, the surface layer is dark grayish brown, friable silt loam or silty clay loam about 8 inches thick. The subsurface layer is brown and dark grayish brown, friable silt loam about 4 inches thick. The subsoil is firm silty clay loam that extends to a depth of 60 inches or more. The upper part is brown, the middle part is dark yellowish brown, and the lower part is yellowish brown and mottled.

The Sylvan soils are sloping and strongly sloping and are moderately permeable. They are on severely eroded side slopes. Typically, the surface layer is mixed brown and yellowish brown, friable silty clay loam about 7 inches thick. The subsoil is friable and is about 20 inches thick. The upper part of the subsoil is yellowish brown silty clay loam and silt loam. The lower part is yellowish brown, mottled silt loam. The underlying material is light brownish gray, mottled, friable, calcareous silt loam to a depth of 60 inches or more.

The minor soils in this association are somewhat poorly drained, nearly level Atterberry and Stronghurst soils.

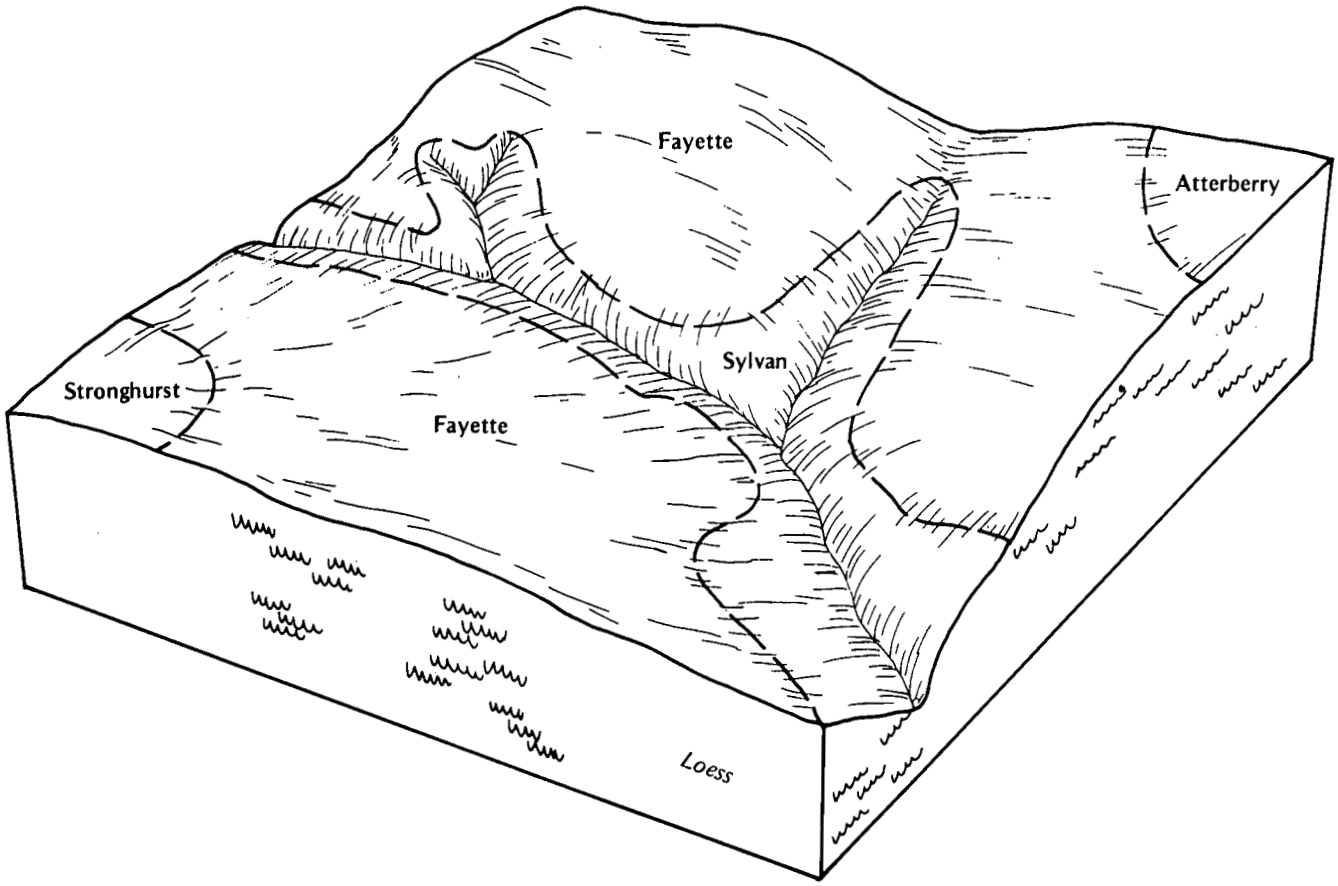


Figure 4.—Typical pattern of soils and parent material in the Fayette-Sylvan association.

Most of this association is used for cultivated crops. Many areas are used for hay or pasture. The nearly level and gently sloping areas are well suited to cultivated crops, hay, and pasture. The moderately eroded, sloping and strongly sloping areas are moderately suited to cultivated crops and well suited to hay and pasture. The severely eroded, sloping and strongly sloping areas are poorly suited to cultivated crops and moderately suited to hay and pasture. Organic matter content is moderately low in the Fayette soils and is low in the Sylvan soils. Available water capacity is high in the Fayette soils and very high in the Sylvan soils. The main management needs are controlling erosion and maintaining tilth and fertility.

5. Hickory-Rozetta-Gosport Association

Nearly level to steep, well drained and moderately well drained soils formed in loess and glacial till, loess, or shale residuum; on uplands

This association consists of ridgetops and of side slopes along drainageways, mainly along creeks. Outcrops of bedrock are on the steeper slopes. Slope ranges from 0 to 50 percent.

This association makes up about 37 percent of the county. The association is about 35 percent Hickory soils, 25 percent Rozetta soils and similar soils, 15 percent Gosport soils, and 25 percent minor soils (fig. 5).

The Hickory soils are moderately steep and steep, well drained, and moderately permeable. They are on side slopes. Typically, the surface layer is brown, friable loam about 2 inches thick. The subsurface layer is brown, friable loam about 32 inches thick. The subsoil is firm and is about 52 inches thick. The upper part is yellowish brown clay loam, and the lower part is yellowish brown loam. The underlying material is yellowish brown, firm loam to a depth of 60 inches or more.

The Rozetta soils are nearly level to sloping, moderately well drained, and moderately permeable. They are on ridgetops above Hickory and Gosport soils.

Typically, the surface layer is mixed brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil is friable and is about 45 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam. The middle part is yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silt loam. The underlying material is yellowish brown, mottled, friable silt loam to a depth of 60 inches or more.

The Gosport soils are moderately steep and steep, moderately well drained, and very slowly permeable. They are on side slopes below Hickory and Rozetta soils. Typically, the surface layer is dark grayish brown, friable silty clay loam about 3 inches thick. The subsurface layer is light olive brown, firm silty clay loam about 3 inches thick. The subsoil is firm and is about 24 inches thick. It is light olive brown silty clay in the upper part and light olive brown, mottled shaly silty clay in the lower part. Grayish brown clay shale is at a depth of about 30 inches.

The minor soils in this association are moderately well drained Ursa soils and somewhat poorly drained Atlas and Wakeland soils. The Ursa and Atlas soils are on side slopes above Hickory and Gosport soils. The Wakeland soils are on nearly level, narrow bottom lands.

Most of this association is used for woodland. Many areas are used for hay and pasture. Some of the less sloping areas are used for cultivated crops. Hickory and Rozetta soils are well suited to woodland, and Gosport soils are poorly suited. Hickory and Rozetta soils range from well suited to poorly suited to hay and pasture, and Gosport soils are unsuited. Rozetta soils range from well suited to poorly suited to corn, soybeans, and small grain. The main management need is erosion control.

6. Haymond-Wakeland Association

Nearly level, well drained and somewhat poorly drained soils formed in medium textured alluvium; on flood plains

This association consists of narrow drainageways, wider creek bottoms, and areas where creeks and streams empty into major tributaries. Old channel scars and silted-in oxbows are in some narrow streambeds and creek bottoms. Flooding is a hazard in all areas. Slopes range from 0 to 3 percent.

This association makes up about 9 percent of the county. The association is about 40 percent Haymond soils, 35 percent Wakeland soils and similar soils, and 25 percent minor soils.

The Haymond soils are well drained and are on slightly higher positions than Wakeland soils. Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is mainly brown, friable silt loam to a depth of 60 inches or more. The lower part has thin strata of loamy sand.

The Wakeland soils are somewhat poorly drained and are on slightly lower positions than Haymond soils. Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 8 inches thick. The underlying material is friable and mottled and extends to a depth of 60 inches or more. The upper part is dark grayish brown silt loam. The lower part is grayish brown, stratified silt loam, fine sandy loam, and gravelly loam.

The minor soils in this association are somewhat poorly drained Kendall soils and well drained Raddle and Martinsville soils. The Kendall and Martinsville soils are on the higher positions on terraces and are not subject to flooding. The Raddle soils are on the more sloping foot slopes adjacent to bluffs.

Most of this association is used for cultivated crops. The soils are well suited to corn, soybeans, and small grain. Organic matter content is moderately low. Available water capacity is very high. The main management needs are protection from flooding and measures that maintain the drainage system and tilth.

7. Darwin-Titus-Beaucoup Association

Nearly level, poorly drained and very poorly drained soils formed in fine textured and moderately fine textured alluvium; on flood plains

This association is a broad flood plain along the Illinois River. Shallow depressions and remnants of old ponds and lakebeds are common. Flooding is a hazard in all areas. Slopes range from 0 to 2 percent.

This association makes up about 3 percent of the county. The association is about 35 percent Darwin soils, 30 percent Titus soils, 25 percent Beaucoup soils, and 10 percent minor soils.

The Darwin soils are poorly drained and very poorly drained and are very slowly permeable. They are on the lowest positions on the flood plain. Typically, the surface soil is very dark gray, firm silty clay about 20 inches thick. The subsoil is mottled, firm silty clay to a depth of 60 inches or more. The upper part of the subsoil is dark gray, and the lower part is gray.

The Titus soils are poorly drained and slowly permeable. They are on low areas of the flood plain. Typically, the surface layer is black, firm silty clay loam about 8 inches thick. The subsurface layer is black, mottled, firm silty clay loam about 10 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is olive gray, firm silty clay loam, and the lower part is grayish brown, friable silty clay loam.

The Beaucoup soils are poorly drained and moderately slowly permeable. They are on slightly higher positions on the flood plain than the Darwin and Titus soils. Typically, the surface layer is black, firm silty clay loam about 7 inches thick. The subsurface layer is very dark gray, mottled, firm silty clay loam about 9 inches thick. The subsoil is mottled silty clay loam to a depth of 60 inches or more. The upper part is firm and dark gray, and the lower part is friable and olive gray.

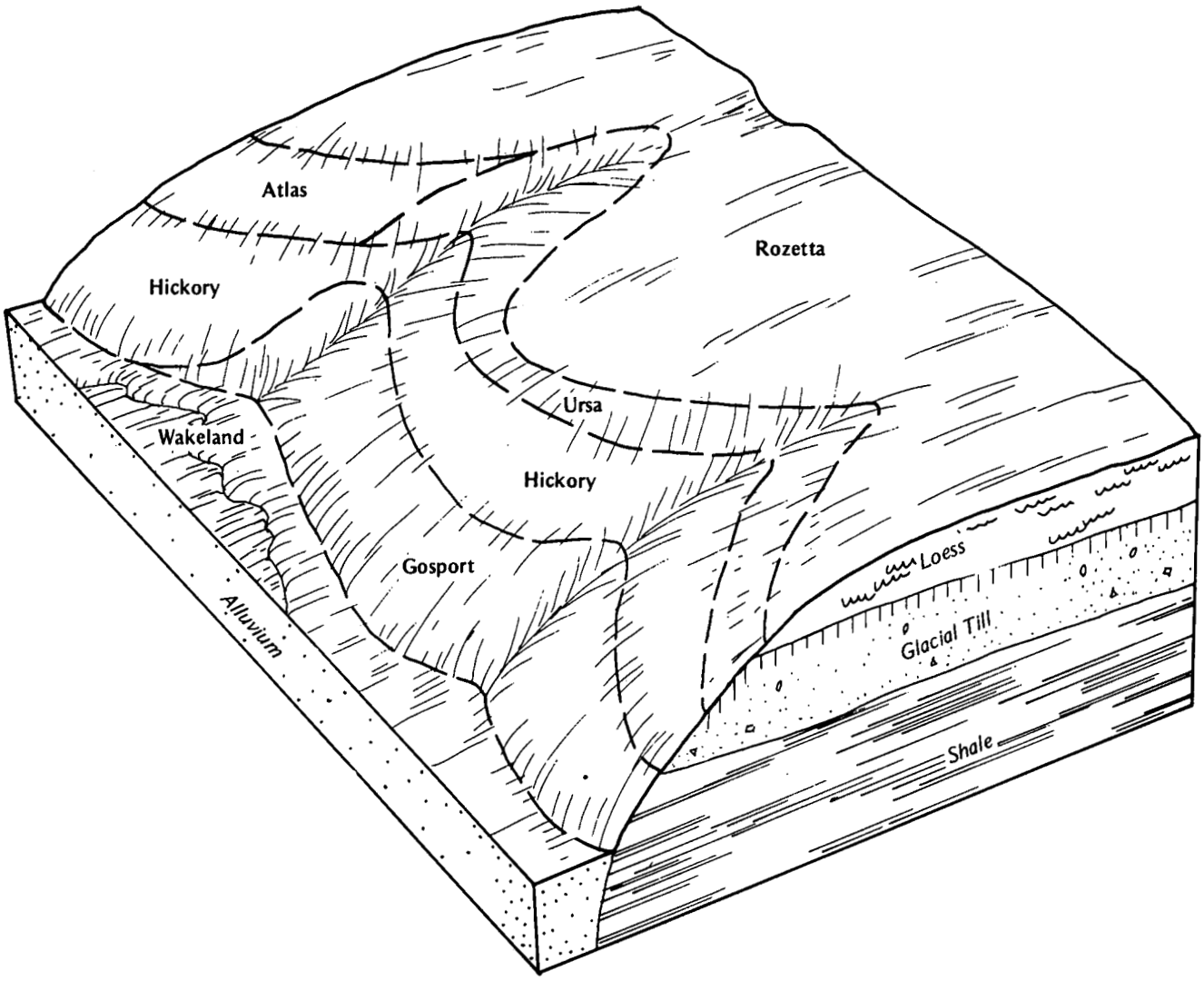


Figure 5.—Typical pattern of soils and parent material in the Hickory-Rozetta-Gosport association.

The minor soils in this association are somewhat poorly drained Coffeen and Orion soils and well drained Onarga soils. The Coffeen and Orion soils are on the higher positions on the flood plain. The Onarga soils are on the higher terraces.

Most of this association is used for cultivated crops. Some areas that are not protected from flooding are used for wetland wildlife habitat. Darwin and Titus soils are moderately suited to corn, soybeans, and small grain; Beaucoup soils are well suited. Organic matter content and available water capacity are high in Beaucoup and Titus soils and moderate in Darwin soils. The main management needs are protection from flooding and measures that maintain the drainage system and tilth.

Broad Land Use Considerations

Nearly half of the acreage in Brown County is used for cultivated crops, mainly corn, soybeans, wheat, and hay (*5*). Most of the acreage in associations 1, 2, 4, 6, and 7 is cultivated. Wetness is a limitation in associations 1 and 7 and in the nearly level portion of association 2. Virden, Ipava, Titus, Darwin, and Keomah soils are the main soils in these associations. Flooding is a hazard in associations 6 and 7. Erosion is the main hazard on

gently sloping and sloping cropland in association 2 and on the soils in associations 3, 4, and 5 that are cultivated. Fayette, Rozetta and Keomah soils are the major soils in associations 2 to 5.

About a quarter of the county is pastured. Many areas of associations 2, 3, 4, and 5 are used for permanent pasture. Fayette, Rozetta, Seaton, Hickory, and Gosport soils are the dominant soils in these associations. These soils range mainly from well suited to poorly suited to pasture; the steep soils are unsuited. Erosion is the main hazard in pastured areas of these associations.

About one-fifth of the county is wooded. The largest areas of woodland are in associations 3, 4, and 5. The dominant soils in these associations are Seaton, Fayette, Hickory, Gosport, and Rozetta soils. Their suitability for woodland ranges from well suited to poorly suited. The main hazard is erosion. Slope in some areas interferes with the operation of equipment.

Very few areas in the county are developed or built up for urban uses. The soils that are best suited to these uses are those in associations 3, 4, and 5, especially Fayette and Rozetta soils. Soils in associations 6 and 7 are subject to flooding and are generally unsuitable as sites for dwellings. Other associations and some other soils in associations 1, 2, and 5 are limited by low strength, frost action, wetness, and slope.

The suitability for wildlife habitat generally is good throughout the county. Associations 3, 4, 5, and 6 are generally well suited to woodland wildlife habitat. Associations 1, 2, and 7 are moderately suited. Association 2 is well suited to openland wildlife habitat, while the other associations are moderately suited. Association 7 is well suited to wetland wildlife habitat.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Fayette silt loam, 5 to 10 percent slopes, eroded, is a phase of the Fayette series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils, or one or more soils and a miscellaneous area, in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Hickory-Gosport complex, 15 to 30 percent slopes, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, quarries, is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Of the counties adjacent to Brown County, only Adams County has a modern soil survey report. In Adams County there are several soils that join similar soils in Brown County, but the soil names are different. The soils in Adams County were not included in the soil survey of Brown County because of their small extent. Also, in some areas the slope gradients do not exactly agree because of wider slope ranges used in Brown County. These differences, however, do not significantly affect the use or management of the map units.

Soil Descriptions

6C2—Fishhook silt loam, 5 to 10 percent slopes, eroded. This soil is sloping and somewhat poorly drained. It is on upland side slopes along drainageways. The areas are long and narrow and range from 5 to 50 acres.

Typically, the surface layer is mixed brown and yellowish brown, friable silt loam about 6 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown and brown, friable silty clay loam. The middle part is grayish brown, friable silty clay loam. The lower part is light brownish gray, firm clay loam and clay. In some areas the light brownish gray clay loam and clay are at a depth of less than 20 inches. In some other areas the surface layer is silty clay loam. In places the soil formed entirely in loess.

Included with this soil in mapping are small areas of well drained Hickory and Ursa soils on the more sloping parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Air and water move through the upper part of the subsoil in this Fishhook soil at a moderate rate and through the lower part of the soil at a slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is perched 1 to 3 feet below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction is neutral or slightly acid in the subsoil, and the surface layer is generally neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high. After hard rains, a crust forms on the surface.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and woodland and well suited to hay and pasture. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

In some areas used for corn, soybeans, or small grain, hillside seepage delays planting and reduces yields and erosion is a hazard. Subsurface drainage helps remove excess water. Terraces, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when soil is wet help keep the soil and pasture in good condition.

The main management concerns on woodland are windthrow and the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Using a harvesting method that does not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and slow permeability limit this soil as a site for septic tank absorption fields. Subsurface tile drains higher on the side slope than the absorption field will intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps overcome the slow permeability.

The land capability classification is IIIe.

6C3—Fishhook silty clay loam, 5 to 10 percent slopes, severely eroded. This soil is sloping and somewhat poorly drained. It is on side slopes along drainageways. The areas are long and narrow and range from 2 to 30 acres.

Typically, the surface layer is mixed brown and dark grayish brown, friable silty clay loam about 5 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is brown, friable silty clay loam. The middle part is grayish brown, friable silty clay loam. The lower part is gray, firm clay loam. In some areas the gray clay loam is at a depth of less than 20 inches. In some other areas the surface layer is silt loam. In places the soil formed entirely in loess.

Included with this soil in mapping are small areas of well drained Hickory and Ursa soils on the more sloping parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Air and water move through the upper part of the subsoil of this Fishhook soil at a moderate rate and through the lower part of the soil at a slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is perched 1 to 3 feet below the surface. Available water capacity is moderate. Organic matter content is low. Reaction ranges from medium acid to neutral in the subsoil, and the surface layer is generally neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops and moderately suited to pasture and hay and woodland. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

In some areas used for corn, soybeans, or small grain, hillside seepage delays planting and reduces yields and erosion is a hazard. Subsurface drainage helps remove excess water. Terraces, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and a crop rotation that includes several years of forage crops will help to control erosion. Incorporating organic matter into the soil helps to improve tilth and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excess runoff and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition. A good seedbed is difficult to prepare on this soil because of surface crusting and the tendency of the soil to be cloddy.

The main management concerns on woodland are windthrow and the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be

reduced by chemical or mechanical means. Using a harvesting method that does not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and slow permeability limit this soil as a site for septic tank absorption fields. Subsurface tile drains higher on the side slope than the absorption field will intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps overcome the slow permeability.

The land capability classification is IVe.

7D2—Atlas silt loam, 10 to 15 percent slopes, eroded. This soil is strongly sloping and somewhat poorly drained. It is on side slopes along drainageways. The areas are long and narrow and range from 4 to 70 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is brown, firm clay loam. The middle part is light brownish gray, grayish brown, and olive gray, mottled, very firm clay loam. The lower part is gray, mottled, firm clay loam. In some areas the subsoil is at a depth of more than 20 inches. In some other areas the surface layer is silty clay loam or clay loam.

Included with this soil in mapping are small areas of moderately well drained Rozetta soils and well drained Hickory soils. The Rozetta soils are in the less sloping areas and have moderate permeability. The Hickory soils are in the steeper areas and have moderate permeability. Included soils make up 8 to 12 percent of the unit.

Air and water move through this Atlas soil at a very slow rate. Surface runoff is rapid in pastured areas. A seasonal high water table is perched between the surface and a depth of 2 feet. Available water capacity is moderate. Organic matter content is moderately low. Reaction ranges from very strongly acid to neutral in the subsoil, and the surface layer is strongly acid. The shrink-swell potential and the potential for frost action are high. After hard rains, a crust commonly forms on the surface.

Most areas of this soil are used for pasture and hay. The soil is moderately suited to pasture and hay and woodland and poorly suited to cultivated crops. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

In some areas used for corn, soybeans, or small grain, hillside seepage delays planting and reduces yields and erosion is a hazard. Subsurface drainage helps remove excess water. Terraces, a conservation tillage system that leaves crop residue on the surface after planting, contour farming, and a crop rotation that includes several years of forage crops will help to control erosion. Incorporating organic matter into the soil helps to improve tilth and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

When this soil is used for woodland, seedling mortality and windthrow are hazards caused by the high clay content of the soil. Using mature planting stock helps to reduce seedling mortality. Using harvesting methods that do not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential, seasonal high water table, and slope limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Underground drains help to control the water table. Cutting and filling help to overcome the slope.

The seasonal high water table and very slow permeability limit this soil as a site for septic tank absorption fields. Subsurface tile drains higher on the side slope than the absorption field will intercept seepage water and overcome the wetness. A specially designed system using sand filters helps to overcome the effects of the very slow permeability.

The land capability classification is IVe.

7D3—Atlas clay loam, 10 to 15 percent slopes, severely eroded. This soil is strongly sloping and somewhat poorly drained. It is on side slopes along drainageways. The areas are long and narrow and range from 5 to 60 acres.

Typically, the surface layer is mixed dark grayish brown and dark yellowish brown, friable clay loam about 8 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is brown, friable clay loam. The lower part is grayish brown, gray, and light brownish gray, firm clay loam. In some areas the subsoil is at a depth of more

than 20 inches. In some other areas the surface layer is silt loam.

Included with this soil in mapping are small areas of well drained Hickory soils and moderately well drained Rozetta soils. The Hickory soils are in the steeper areas. The Rozetta soils are in the less sloping areas. Both soils have moderate permeability. Included areas make up 8 to 12 percent of the unit.

Air and water move through this Atlas soil at a very slow rate. Surface runoff is rapid in pastured areas. A seasonal high water table is perched between the surface and a depth of 2 feet. Available water capacity is moderate. Organic matter content is low. Reaction ranges from slightly acid to mildly alkaline in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are used for pasture and hay. The soil is moderately suited to woodland, poorly suited to pasture and hay, and unsuited to cultivated crops. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

Establishment of pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition. A good seedbed is difficult to prepare because of surface crusting and the tendency of the soil to become cloddy. A no-till method of pasture renovation and seeding on the contour helps to prevent further erosion.

When this soil is used for woodland, seedling mortality and windthrow are hazards caused by the high clay content of the soil. Using mature planting stock helps to reduce seedling mortality. Using harvesting methods that do not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential, seasonal high water table, and slope limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Underground drains help to control the water table. Cutting and filling help to overcome the slope.

The seasonal high water table and very slow permeability limit this soil as a site for septic tank absorption fields. Subsurface tile drains higher on the side slope than the absorption field will intercept seepage water and overcome the wetness. A specially designed system using sand filters helps to overcome the effects of the very slow permeability.

The land capability classification is VIe.

8F—Hickory loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 10 to 150 acres.

Typically, the surface layer is brown, friable loam about 2 inches thick. The subsurface layer is brown, friable loam about 3 inches thick. The subsoil is firm and is about 52 inches thick. The upper part of the subsoil is yellowish brown clay loam. The lower part is yellowish brown loam. The underlying material is yellowish brown, firm loam to a depth of 60 inches or more. In places the soil formed entirely in loess.

Included with this soil in mapping are small areas of somewhat poorly drained Atlas soils, moderately well drained Gosport soils, and well drained Ursa soils. The Gosport soils have shale bedrock at a depth of less than 40 inches. The Atlas and Ursa soils are in the less sloping areas and have more clay and slower permeability in the subsoil than this Hickory soil. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Hickory soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is high. Organic matter content is moderately low. Reaction in the subsoil ranges from very strongly acid to neutral. The shrink-swell potential and the potential for frost action are moderate.

Most areas of this soil are wooded. The soil is well suited to woodland and woodland wildlife habitat. It is poorly suited to pasture and hay and as a site for dwellings, septic tank absorption fields, and local roads and streets. It is unsuited to cultivated crops.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and

damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of this soil as a site for dwellings or septic tank absorption fields. Cutting and filling helps to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIe.

8G—Hickory loam, 30 to 50 percent slopes. This soil is steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 5 to 200 acres.

Typically, the surface layer is dark grayish brown, friable loam about 2 inches thick. The subsurface layer is grayish brown, friable loam about 5 inches thick. The subsoil is yellowish brown, friable and firm clay loam to a depth of 60 inches or more. In places the soil formed entirely in loess.

Included with this soil in mapping are small areas of somewhat poorly drained Atlas soils and moderately well drained Gosport soils. The Atlas soils are in the less sloping areas. They have more clay in the subsoil than this Hickory soil and have slower permeability. The Gosport soils have shale bedrock at a depth of less than 40 inches. Rock outcroppings are at the base of some slopes. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Hickory soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is high. Organic matter content is moderately low. Reaction in the subsoil ranges from very strongly acid to medium acid. The shrink-swell potential and the potential for frost action are moderate.

Most areas of this soil are wooded. The soil is well suited to woodland and woodland wildlife habitat. It is poorly suited as a site for local roads and streets and, because of slope, is unsuited as a site for dwellings and septic tank absorption fields. It is unsuited to cultivated crops and hay and pasture because of the erosion hazard.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

The land capability classification is VIIe.

16—Rushville silt loam. This soil is nearly level and poorly drained. It is in depressions and on ridgetops. It is occasionally ponded for brief periods in early spring. The areas are irregular in shape and range from 2 to 40 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is light gray and light brownish gray, friable silt loam about 5 inches thick. The subsoil is mottled and is about 45 inches thick. The upper part of the subsoil is grayish brown, firm silty clay loam. The middle part is grayish brown, very firm silty clay. The lower part is grayish brown and light gray, firm silty clay loam. The underlying material is greenish gray, friable silt loam to a depth of 60 inches or more. In some areas, the surface layer is darker and the upper part of the subsoil is not so gray.

Included with this soil in mapping are small areas of well drained Fayette soils and moderately well drained Rozetta soils on the more sloping parts of the landscape. Included soils make up 5 to 8 percent of the unit.

Air and water move through this Rushville soil at a slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal water table ranges from 1 foot above the surface to 1 foot below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction ranges from very strongly acid to neutral in the subsoil, and the surface layer commonly is neutral or slightly acid because of past liming practices. The shrink-swell potential and the potential for frost action are high. After hard rains, a crust commonly forms on the surface.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and hay and pasture. It is poorly suited to local roads and streets. It is generally unsuited as a site for dwellings and septic tank absorption fields because of the ponding.

A system of shallow surface ditches and tile inlets is needed if this soil is used for corn, soybeans, or small grain. Tile drains do not function well because of the slow permeability of the soil. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water intake in the soil.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage

production and causes surface compaction and poor tilth. A seasonal high water table and ponding of surface water restrict the growth of some forage crops. Shallow surface ditches and tile inlets help remove water from the soil. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The land capability classification is IIIw.

17A—Keomah silt loam, 0 to 2 percent slopes. This soil is nearly level and somewhat poorly drained. It is on ridgetops and interfluves. The areas are irregular in shape and range from 3 to 300 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 6 inches thick. The subsurface layer is brown, friable silt loam about 3 inches thick. The subsoil is mottled and is about 47 inches thick. The upper part of the subsoil is brown, firm silty clay loam. The middle part is brown, very firm silty clay. The lower part is grayish brown and light olive gray, firm silty clay loam. The underlying material is light brownish gray, friable silt loam to a depth of 60 inches or more. In some areas the surface soil is darker. In some other areas there is less clay in the subsoil.

Included with this soil in mapping are small areas of well drained Fayette soils on the more sloping parts of the landscape and poorly drained Rushville soils in the lower depressions. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Keomah soil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 2 to 4 feet below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction is strongly acid or very strongly acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high. After hard rains, a crust commonly forms on the surface.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and pasture and hay. It is moderately suited to woodland. It is poorly suited as a site for septic tank absorption fields, dwellings with basements, and local roads and streets.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface tile drains, for example, are suitable if outlets are available. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and reduce crusting.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Subsurface tile drains will help to overcome the wetness. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is IIw.

17B—Keomah silt loam, 2 to 5 percent slopes. This soil is gently sloping and somewhat poorly drained. It is on ridgetops. The areas are irregular in shape and range from 2 to 80 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The subsoil is mottled and friable and is about 43 inches thick. The upper part of the subsoil is yellowish brown and brown silty clay loam. The middle part is grayish brown silty clay loam. The lower part is grayish brown silt loam. The underlying material is light olive brown, friable silt loam to a depth of 60 inches or more. In some areas the surface layer is darker. In some other areas there is less clay in the subsoil.

Included with this soil in mapping are small areas of poorly drained Rushville soils on the less sloping parts of the landscape. These soils are subject to ponding. Also included are well drained Fayette soils. Included soils make up 4 to 10 percent of the unit.

Air and water move through this Keomah soil at a moderately slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 2 to 4 feet below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction ranges from very strongly acid to medium acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high. After hard rains, a crust commonly forms on the surface.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and to pasture and hay. It is moderately suited to woodland. It is poorly suited as a site for septic tank absorption fields, dwellings with basements, and local roads and streets.

Drainage, mainly by subsurface tile drains, is needed if this soil is used for corn, soybeans, or small grain. Erosion is a hazard. Conservation tillage systems that leave crop residue on the surface after planting, contour farming, and terraces help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is IIe.

19C3—Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded. This soil is sloping and well drained. It is on shoulder slopes and side slopes along drainageways. The areas are long and narrow and range from about 5 to 30 acres.

Typically, the surface layer is mixed dark yellowish brown and dark grayish brown, friable silty clay loam about 8 inches thick. The subsoil is friable and is about 20 inches thick. The upper part of the subsoil is yellowish brown silty clay loam. The middle part is yellowish brown silt loam. The lower part is yellowish brown, mottled silt loam. The underlying material is light brownish gray, mottled, friable, calcareous silt loam to a depth of 60 inches or more. In some areas the surface layer is silt loam. In some other areas the subsoil extends to a depth of more than 40 inches.

Air and water move through this soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is low. Reaction in the subsoil is neutral, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops and moderately suited to hay and pasture. It is well suited to woodland and as a site for dwellings with basements and for septic tank absorption fields. It is moderately suited as a site for dwellings without basements and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Terraces, conservation tillage systems that leave crop residue on the surface after planting, contour farming, and a crop rotation that includes several years of forage crops will help to control erosion. Incorporating additional organic matter into the soil helps to improve tilth and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. A good seedbed is difficult to prepare on this soil because of surface crusting and the tendency of the soil to become cloddy.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IVe.

19D3—Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded. This soil is strongly sloping and well drained. It is on shoulder slopes and on side slopes along drainageways. The areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is mixed brown and yellowish brown, friable silty clay loam about 7 inches thick. The subsoil is friable and is about 20 inches thick. The upper part of the subsoil is yellowish brown silty clay loam and silt loam. The lower part is yellowish brown, mottled silt loam. The underlying material is light brownish gray, mottled, friable, calcareous silt loam to a depth of 60 inches or more. In some areas the surface layer is silt loam. In some other areas the subsoil extends to a depth of more than 40 inches.

Air and water move through this soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content is low. Reaction is neutral or mildly alkaline in the subsoil,

and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops. It is moderately suited to hay and pasture and as a site for dwellings and septic tank absorption fields. It is well suited to woodland and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. A crop rotation dominated by forage crops, contour farming, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Incorporating organic matter into the soil helps to reduce crusting and improve tilth.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential limits this soil as a site for dwellings, especially those without basements. Slope is an additional limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

Slope is a limitation of this soil as a site for septic tank absorption fields. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IVe.

19F3—Sylvan silt loam, 15 to 30 percent slopes, severely eroded. This soil is moderately steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 10 to 100 acres.

Typically, the surface layer is dark brown, friable silt loam about 4 inches thick. The subsoil is dark yellowish brown, friable silt loam about 22 inches thick. It is mottled in the lower part. The underlying material is gray, mottled, calcareous, friable silt loam to a depth of 60 inches or more. In some areas the subsoil extends to a depth of more than 40 inches. In some other areas, the subsoil contains more sand or calcareous material is immediately below the surface.

Air and water move through this soil at a moderate rate. Surface runoff is rapid in pastured areas. Available water capacity is very high. Organic matter content is low. Reaction in the subsoil is neutral. The shrink-swell potential is low. The potential for frost action is high.

Most areas of this soil are used for hay and pasture. The soil is poorly suited to hay and pasture and unsuited to cultivated crops. It is well suited to woodland and woodland wildlife habitat. It is poorly suited as a site for local roads and streets, dwellings, and septic tank absorption fields.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of this soil as a site for dwellings or septic tank absorption fields. Cutting and filling help to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIe.

26—Wagner silt loam. This soil is nearly level and poorly drained. It is on low terraces. The areas are irregular in shape and range from 80 to 200 acres. They are occasionally flooded for brief periods from March to May.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface

layer is grayish brown and dark grayish brown, mottled, friable silt loam about 8 inches thick. The subsoil is mottled, friable silty clay loam to a depth of 60 inches or more. The upper part of the subsoil is brown, the middle part is yellowish brown, and the lower part is grayish brown. In some areas the surface layer is more than 10 inches thick. In some other areas the subsoil is grayer or contains more clay.

Included with this soil in mapping are small areas of well drained Onarga soils on the higher positions. Included soils make up about 2 to 5 percent of the unit.

Air and water move through this Wagner soil at a very slow rate. Surface runoff is slow in cultivated areas. A seasonal water table is within a depth of 2 feet. Available water capacity is high. Organic matter content is moderate. Reaction in the subsoil ranges from medium acid to neutral, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops. Because this soil is subject to flooding, it is poorly suited as a site for local roads and streets and is generally unsuited as a site for dwellings and septic tank absorption fields. It is poorly suited to woodland.

Most areas of this soil have been sufficiently drained for corn, soybeans, or small grain, but measures that maintain or improve drainage are needed. Shallow surface drains and surface inlet tile, for example, are suitable. In some years flooding damages crops. Levees reduce the damage caused by floodwaters. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and causes seedling mortality and a windthrow hazard. Plant competition is a management concern. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. Using a harvesting method that does not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIIw.

30G—Hamburg silt, 25 to 50 percent slopes. This soil is steep and somewhat excessively drained. It is on side slopes. The areas are irregular in shape and range from 15 to 30 acres.

Typically, the surface layer is very dark grayish brown, friable, calcareous silt about 5 inches thick. The next layer is dark brown, friable, calcareous silt about 11 inches thick. The underlying material is dark yellowish brown and yellowish brown, friable, calcareous silt to a depth of 60 inches or more. In places the calcareous material is at a depth of more than 20 inches.

Included with this soil in mapping are small outcroppings of limestone bedrock. Included areas make up 2 to 5 percent of the unit.

Air and water move through this Hamburg soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high. Organic matter content is low. Reaction in the surface layer is mildly alkaline. The shrink-swell potential is low. The potential for frost action is high.

Most areas of this soil are wooded. The soil is poorly suited to woodland and moderately suited to woodland wildlife habitat. It is unsuited to cultivated crops and to hay and pasture. It is poorly suited as a site for local roads and streets, dwellings, and septic tank absorption fields.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of this soil as a site for dwellings or septic tank absorption fields. Cutting and filling help to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIIe.

43A—Ipava silt loam, 0 to 2 percent slopes. This soil is nearly level and somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 20 to 150 acres.

Typically, the surface layer is black, friable silt loam about 14 inches thick. The subsoil is firm silty clay loam about 40 inches thick. The upper part of the subsoil is very dark gray. The middle part is grayish brown and mottled. The lower part is light brownish gray and mottled. The underlying material is light brownish gray, mottled, friable silt loam to a depth of 60 inches or more. Some areas have a subsurface layer that is lighter in color and has less clay. In some other areas, the upper part of the subsoil is gray or the surface layer is less than 10 inches thick.

Included with this soil in mapping are small areas of poorly drained Denny soils in shallow depressions that are subject to ponding. Included soils make up 3 to 7 percent of the unit.

Air and water move through this Ipava soil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity and organic matter content are high. Reaction in the subsoil is medium acid or slightly acid, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is I.

43B—Ipava silt loam, 2 to 5 percent slopes. This soil is gently sloping somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 4 to 100 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 11 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is brown, firm silty clay loam. The middle part is yellowish brown, friable silty clay loam. The lower part is light brownish gray, friable silt loam. In some areas the surface layer is less than 10 inches thick.

Included with this soil in mapping are small areas of somewhat poorly drained Keller soils. These soils have less clay in the subsoil than this Ipava soil and are more sloping. They make up 2 to 5 percent of the unit.

Air and water move through this Ipava soil at a moderately slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity and organic matter content are high. Reaction in the subsoil ranges from medium acid to neutral, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

Erosion is a hazard if this soil is used for corn, soybeans, or small grain. Conservation tillage systems that leave crop residue on the surface after planting, contour farming, and terraces help to maintain tilth and reduce erosion.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is IIe.

45—Denny silt loam. This soil is nearly level and poorly drained. It is in nearly level areas and closed depressions on uplands. It is occasionally ponded for brief periods in early spring (fig. 6). The areas are irregular in shape and range from 3 to 10 acres.

Typically, the surface layer is mixed very dark grayish brown and gray, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, mottled, friable silt loam about 6 inches thick. The subsoil is mottled and friable and firm and extends to a depth of 60 inches or more. The upper part of the subsoil is gray silty clay loam. The middle part is light brownish gray silt loam. The lower part is light brownish gray silt loam. In some places the surface layer is more than 10 inches thick. In other places there is no silt loam subsurface layer.

Included with this soil in mapping are small areas of somewhat poorly drained Herrick and Ipava soils on the higher positions that are not subject to ponding. Included soils make up 4 to 8 percent of the unit.

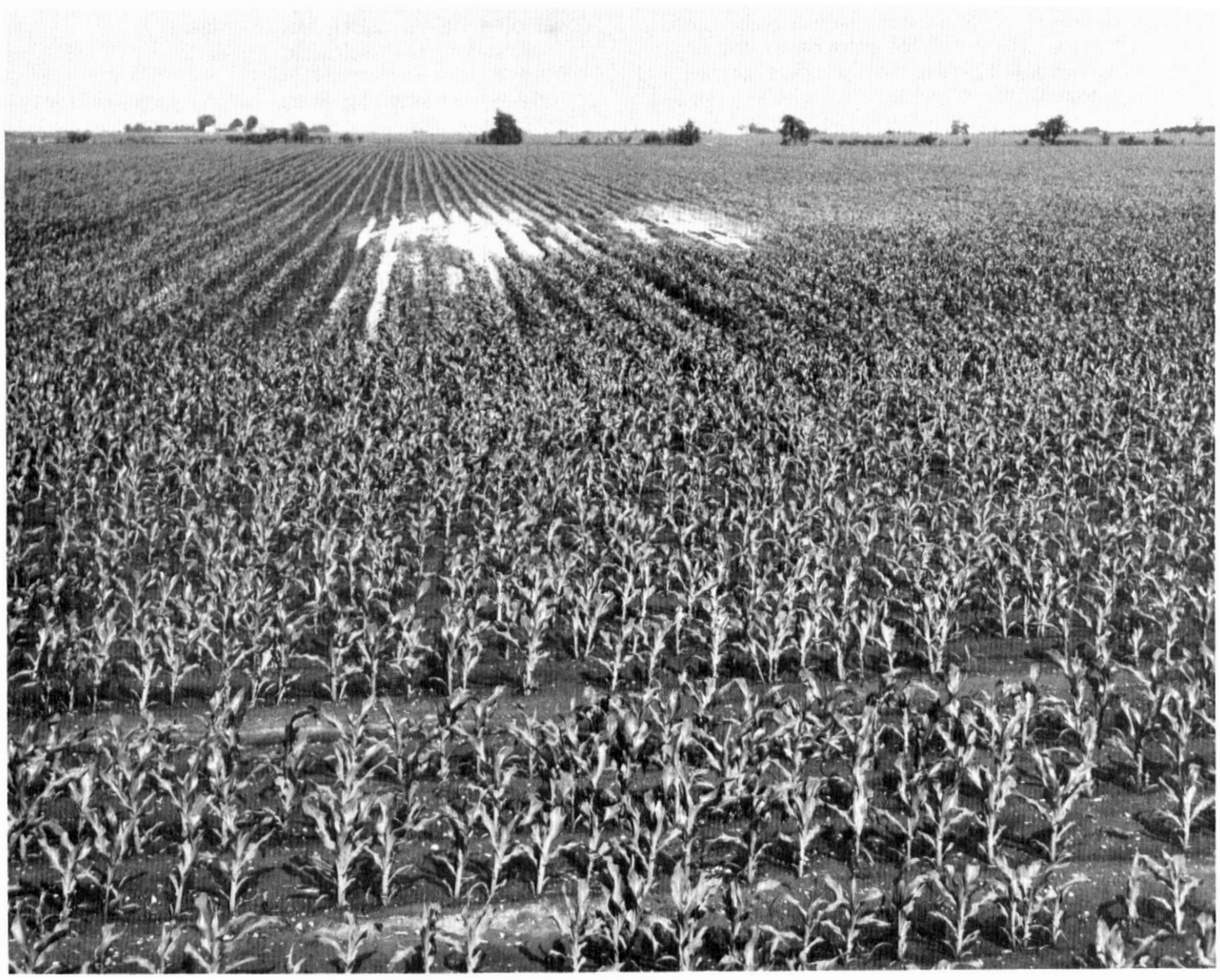


Figure 6.—Ponding in a low area of Denny silt loam.

Air and water move through this Denny soil at a slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table ranges from 6 inches above the surface to a depth of 2 feet. Available water capacity is high. Organic matter content is moderate. Reaction in the subsoil is medium acid or slightly acid, and the surface layer commonly is neutral or slightly acid because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture, and hay. It is poorly suited as a site for local roads and streets and is generally unsuited as a site for dwellings and septic tank absorption fields because of the ponding.

A system of shallow surface ditches and tile inlets is needed if this soil is used for corn, soybeans, or small grain. Tile drains do not function well because of the slow permeability of the soil. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water intake in the soil.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction and poor

tilth. The seasonal high water table and ponding of surface water restrict the growth of some forage crops. Shallow surface ditches and tile inlets help remove water from the soil. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The land capability classification is IIw.

46—Herrick silt loam. This soil is nearly level and somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 3 to 150 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 12 inches thick. The subsurface layer is very dark grayish brown, friable silt loam about 6 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, firm silty clay loam. The middle part is grayish brown, yellowish brown, and light brown, firm silty clay loam. The lower part is light brownish gray, friable silt loam. In places the subsurface layer is darker and contains more clay. In some other places the upper part of the subsoil is less than 10 inches thick.

Included with this soil in mapping are small areas of poorly drained Denny soils in the lower depressional positions that are subject to ponding. Included soils make up 5 to 8 percent of the unit.

Air and water move through this Herrick soil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is high. Organic matter content is moderate. Reaction in the subsoil is medium acid or strongly acid, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface tile drains, for example, are suitable if outlets are available. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and reduce crusting.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is IIw.

50—Virden silty clay loam. This soil is nearly level and poorly drained. It is in low areas and shallow depressions on upland divides. It is occasionally ponded for brief periods in the spring. The areas are irregular in shape and range from 10 to 1,200 acres.

Typically, the surface soil is black, friable silty clay loam about 14 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is very dark gray and olive gray, firm silty clay loam. The next part is gray, friable silty clay loam. The lower part is gray, friable silt loam. In some areas the soil is dark colored to a depth of more than 24 inches. In some other areas, the surface layer is silt loam or the upper part of the subsoil is browner.

Air and water move through this soil at a moderately slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table ranges from 6 inches above the surface to a depth of 2 feet. Available water capacity and organic matter content are high. Reaction is neutral in the subsoil and the surface layer. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. It is poorly suited as a site for local roads and streets and is generally unsuited as a site for septic tank absorption fields and dwellings because of the ponding.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface tile drains and surface inlet tile are suitable. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water intake.

The land capability classification is IIw.

61—Atterberry silt loam. This soil is nearly level and somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 4 to 30 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 4 inches thick. The subsoil is mottled and friable and firm and extends to a depth of 60 inches or more. The upper part of the subsoil is dark yellowish brown silty clay loam. The lower part is light brownish gray silty clay loam. In some areas the surface layer is lighter in color.

Included with this soil in mapping are small areas of well drained Downs and Fayette soils on the more sloping parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Atterberry soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderate. Reaction in the subsoil is slightly acid or medium acid, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate. The potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture, and hay. It is moderately suited to woodland. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Subsurface tile drains will help to overcome the wetness. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

In the areas of this soil used for woodland, control of livestock is needed to prevent reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is I.

70—Beaucoup silty clay loam. This soil is nearly level and poorly drained. It is on flood plains. It is rarely flooded and occasionally ponded for brief periods in early spring. The areas are irregular in shape and range from 20 to 400 acres.

Typically, the surface layer is black, firm silty clay loam about 14 inches thick. The subsurface layer is very dark gray, mottled, firm silty clay loam about 9 inches thick. The subsoil is mottled silty clay loam that extends to a depth of 60 inches or more. The upper part of the subsoil is firm and dark gray, and the lower part is friable and olive gray. In some areas the surface soil is silt loam. In some other areas the surface soil is thicker than 24 inches.

Included with this soil in mapping are small areas of poorly drained and very poorly drained Darwin soils in the lower positions. These soils have an average clay content of more than 45 percent in the subsoil. Also included are small areas of well drained Onarga soils in the higher positions. Included soils make up 3 to 8 percent of the unit.

Air and water move through this Beaucoup soil at a moderately slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table is 6 inches above the surface to 2 feet below the surface. Available water capacity and organic matter content are high. Reaction is neutral in the subsoil and the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and to woodland and is poorly suited as a site for local roads and streets. Because it is subject to rare flooding and occasional ponding, the soil is generally unsuited as a site for dwellings and septic tank absorption fields.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface tile drains and surface inlet tile are suitable. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water intake.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment. Also, seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIw.

71—Darwin silty clay. This soil is nearly level and poorly drained. It is on flood plains. It is rarely flooded and occasionally ponded for brief periods in the spring. The areas are irregular in shape and range from 50 to 600 acres.

Typically, the surface layer is very dark gray, firm silty clay about 9 inches thick. The subsurface layer is very dark gray, firm silty clay about 11 inches thick. The subsoil is mottled, firm silty clay to a depth of 60 inches or more. The upper part of the subsoil is dark gray, and the lower part is gray. In some areas the soil contains

less clay. In some other areas the thickness of the surface layer and subsurface layer is more than 24 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Coffeen and Orion soils. These soils have less clay in the subsoil than this Darwin soil. Also included are well drained Onarga soils on the higher positions. Included soils make up 10 to 12 percent of the unit.

Air and water move through this Darwin soil at a very slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table ranges from 1 foot above the surface to 1 foot below the surface. Available water capacity and organic matter content are moderate. Reaction is neutral in the subsoil, and the surface layer is slightly acid. The shrink-swell potential is very high, and the potential for frost action is moderate. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and woodland. Because it is subject to rare flooding and occasional ponding, it is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Flooding during the growing season damages crops in some years. Tile drains do not function well in this soil because of the very slow permeability, but shallow surface drains and surface inlet tile are suitable. Levees reduce the extent of crop damage caused by flooding. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

In areas of this soil used for woodland, the seasonal high water limits the use of equipment. Also, seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIIw.

119D—Elco silt loam, 10 to 15 percent slopes. This soil is strongly sloping and moderately well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 5 to 40 acres.

Typically, the surface layer is brown, friable silt loam about 10 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, friable silt loam and silty clay loam. The lower part is grayish brown and brown, firm clay loam. In some areas there is less sand in the subsoil. In some other areas the clay loam part of the subsoil is at a depth of less than 20 inches. In places the part of the soil immediately below the surface layer is gray.

Included with this soil in mapping are small areas of somewhat poorly drained Keomah soils on the less sloping parts of the landscape. Included soils make up 4 to 6 percent of the unit.

Air and water move through this Elco soil at a moderately slow rate. Surface runoff is rapid in pastured areas. A seasonal high water table is perched at a depth of 2.5 to 4.5 feet. Available water capacity is high. Organic matter content is moderately low. Reaction ranges from neutral to medium acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are pastured (fig. 7). The soil is well suited to pasture and hay and woodland and is moderately suited to cultivated crops. It is moderately suited as a site for dwellings without basements. It is poorly suited as a site for dwellings with basements, for septic tank absorption fields, and for local roads and streets.

Erosion is a hazard in areas used for corn, soybeans, or small grain. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion, maintain tilth, and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential, seasonal high water table, and slope limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Underground drains help to control the water table. Cutting and filling help to overcome the slope.

The seasonal high water table, moderately slow permeability, and slope limit this soil as a site for septic

Figure 7.—A pastured area of Elco silt loam, 10 to 15 percent slopes.

tank absorption fields. Placing underground drains higher on the side slope than the absorption field helps to lower the water table. Enlarging the absorption area helps to overcome the effects of the moderately slow permeability. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IIIe.

119D3—Elco silty clay loam, 10 to 15 percent slopes, severely eroded. This soil is strongly sloping and moderately well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 5 to 30 acres.

Typically, the surface layer is mixed brown and yellowish brown, friable silty clay loam about 6 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, friable silty clay loam. The middle part is yellowish brown, mottled, friable and firm silty clay loam. The lower part is brown, mottled, firm clay loam. In some areas there is less sand in the subsoil. In some other areas the clay loam part of the subsoil is at a depth of less than 20 inches. In places the part of the soil immediately below the surface layer is gray.

Included with this soil in mapping are small areas of somewhat poorly drained Keomah soils on the less sloping parts of the landscape. Included soils make up 4 to 6 percent of the unit.

Air and water move through this Elco soil at a moderately slow rate. Surface runoff is rapid in cultivated areas. A seasonal high water table is perched at a depth of 2.5 to 4.5 feet. Available water capacity is high. Organic matter content is low. Reaction is neutral in the subsoil and the surface layer. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is well suited to woodland. It is moderately suited to pasture and hay and poorly suited to cultivated crops. It is moderately suited as a site for dwellings without basements and is poorly suited as a site for dwellings with basements, for septic tank absorption fields, and for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. A crop rotation dominated by forage crops, contour farming, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Incorporating organic matter into the soil helps to reduce crusting and improve tilth.

Establishment of pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition. A good seedbed is difficult to prepare because of surface crusting and the tendency of the soil to become cloddy. A no-till method of pasture renovation and seeding on the contour helps to prevent further erosion.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential, seasonal high water table, and slope limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Underground drains help to control the water table. Cutting and filling help to overcome the slope.

The seasonal high water table, moderately slow permeability, and slope limit this soil as a site for septic tank absorption fields. Placing underground drains higher on the side slope than the absorption field helps to lower the water table. Enlarging the absorption area helps to overcome the effects of the moderately slow permeability. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IVe.

150—Onarga loam, rarely flooded. This soil is nearly level and well drained. It is on terraces along the Illinois River. The areas are irregular in shape and range from 50 to 300 acres.

Typically, the surface soil is very dark grayish brown, friable loam about 20 inches thick. The subsoil is brown and is about 32 inches thick. The upper part of the subsoil is friable loam. The middle part is mottled, friable loam. The lower part is very friable sandy loam. The underlying material is brown, very friable fine sandy loam to a depth of 60 inches or more.

Air and water move through this soil at a moderate rate in the upper part of the subsoil and a rapid rate in the lower part of the subsoil and the underlying material. Surface runoff is slow in cultivated areas. Available water capacity is high. Organic matter content is moderate. Reaction is medium acid in the subsoil. It commonly is neutral in the surface layer because of past liming practices. The potential for frost action is moderate.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. Because it is subject to flooding, it is poorly suited as a site for local roads and streets, only moderately suited as a site for septic tank absorption fields, and generally unsuited as a site for dwellings.

In areas of this soil used for corn, soybeans, or small grain, keeping tillage to a minimum and leaving crop residue on the surface after planting help to improve tilth and productivity.

The land capability classification is I.

242A—Kendall silt loam, 0 to 3 percent slopes. This soil is nearly level and somewhat poorly drained. It is on stream terraces. The areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 10 inches thick. The subsurface layer is grayish brown, friable silt loam about 6 inches thick. The subsoil is mottled and firm and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown silty clay loam. The middle part is grayish brown silty clay loam. The lower part is yellowish brown silt loam. In places the soil contains more sand throughout.

Included with this soil in mapping are small areas of well drained Martinsville soils on the more sloping parts of the landscape. Also included are small areas of well drained Haymond and somewhat poorly drained Wakeland soils, which are on the lower positions on flood plains and are subject to flooding. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Kendall soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderately low. Reaction ranges from slightly acid to very strongly acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate. The potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, woodland, pasture, and hay. It

is poorly suited as a site for dwellings, septic tank absorption fields, and local roads and streets.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface tile drains, for example, are suitable if outlets are available. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and reduce crusting.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Subsurface tile drains will help to overcome the wetness. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is IIw.

257A—Clarksdale silt loam, 0 to 2 percent slopes. This soil is nearly level and somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 4 to 40 acres.

Typically, the surface layer is very dark gray, friable silt loam about 8 inches thick. The subsurface layer is dark gray, friable silt loam about 4 inches thick. The subsoil is mottled, firm silty clay loam about 39 inches thick. The upper part of the subsoil is dark grayish brown and brown. The middle part is grayish brown and light brownish gray. The lower part is light olive gray. The underlying material is light olive gray, mottled, friable silt loam to a depth of 60 inches or more. In places the surface layer is lighter in color or is more than 10 inches thick. In some other places gray mottles are at a depth of more than 30 inches.

Included with this soil in mapping are small areas of well drained Downs and Fayette soils on the steeper slopes. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Clarksdale soil at a moderately slow rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is high. Organic matter content is moderate. Reaction ranges from strongly acid to neutral in the subsoil, and the surface layer commonly is neutral or slightly acid because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, woodland, and pasture and hay. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

No major limitations affect the use of this soil for corn, soybeans, or small grain. The seasonal high water table can delay planting in some years. Subsurface tile drains function satisfactorily if suitable outlets are available. A conservation tillage system that leaves crop residue on the surface after planting helps to maintain tilth and fertility.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Subsurface tile drains will help to overcome the wetness. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is I.

257B—Clarksdale silt loam, 2 to 5 percent slopes. This soil is gently sloping and somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 6 to 30 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 9 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, friable

silty clay loam. The middle part is grayish brown and gray, firm silty clay loam. The lower part is pinkish gray, friable silt loam. In some areas the surface layer is lighter in color or is more than 10 inches thick. In some other areas gray mottles are at a depth of more than 30 inches.

Included with this soil in mapping are small areas of well drained Fayette and Downs soils on the upland divides. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Clarksdale soil at a moderately slow rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is high. Organic matter content is moderate. Reaction ranges from medium acid to neutral in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture and hay, and woodland. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

Erosion is a hazard if this soil is used for corn, soybeans, or small grain. Conservation tillage systems that leave crop residue on the surface after planting, contour farming, and terraces help to maintain tilth and reduce erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and the moderately slow permeability are the main limitations of this soil as a site for septic tank absorption fields. Curtain drains in the areas adjacent to the absorption field help to lower the water table. Enlarging the absorption area helps to overcome the moderately slow permeability.

The land capability classification is IIe.

264F—El Dara fine sandy loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 10 to 60 acres.

Typically, the surface layer is dark grayish brown and dark brown, friable fine sandy loam about 11 inches thick. The subsoil is friable and is about 43 inches thick. The upper part of the subsoil is brown sandy loam. The middle part is brown sandy clay loam. The lower part is brown sandy loam. The underlying material is yellowish brown, friable silt loam to a depth of 60 inches or more. In places there is less sand throughout. In some other places the soil is up to 20 percent gravel throughout.

Included with this soil in mapping are small areas of sand and gravel. Included areas make up 4 or 5 percent of the unit.

Air and water move through this El Dara soil at a moderate rate. Surface runoff is rapid in areas used for pasture. Available water capacity is moderate. Organic matter content is moderately low. Reaction ranges from very strongly acid to medium acid in the subsoil. The shrink-swell potential is low, and the potential for frost action is moderate.

Most areas of this soil are pastured. This soil is well suited to woodland and woodland wildlife habitat. It is poorly suited to hay and pasture and as a site for dwellings, septic tank absorption fields, and local roads and streets.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife.

Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of this soil as a site for dwellings or septic tank absorption fields. Cutting and filling help to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIe.

264G—El Dara fine sandy loam, 30 to 50 percent slopes. This soil is steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsurface layer is very friable fine sandy loam about 11 inches thick. The upper part of the subsurface layer is brown, and the lower part is yellowish brown. The subsoil extends to a depth of 60 inches or more. In sequence downward, it is brown, friable sandy loam; strong brown, firm sandy clay loam; strong brown, friable fine sandy loam; and strong brown, very friable loamy sand. In places there is less sand throughout the profile. In some other places the soil is up to 20 percent gravel throughout.

Included with this soil in mapping are small areas of sand and gravel. Included areas make up 3 to 5 percent of the unit.

Air and water move through this El Dara soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is moderate. Organic matter content is moderately low. Reaction in the subsoil ranges from medium acid to very strongly acid. The shrink-swell potential is low. The potential for frost action is moderate.

Most areas of this soil are wooded. The soil is well suited to woodland and woodland wildlife habitat. It is unsuited to cultivated crops and to hay and pasture. Because of slope, it is generally unsuited as a site for dwellings, septic tank absorption fields, and local roads and streets.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

Wooded areas provide good habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

The land capability classification is VIIe.

274F—Seaton silt loam, 15 to 30 percent slopes. This soil is moderately steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 10 to 100 acres.

Typically, the surface layer is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is dark yellowish brown, friable silt loam about 3 inches thick. The subsoil is friable silt loam and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown, and the lower part is dark yellowish brown. In some areas the subsoil is silty clay loam or contains more sand. In some other areas calcareous silt loam is within 40 inches of the surface.

Included with this soil in mapping are small areas of exposed limestone bedrock. Included areas make up 2 to 5 percent of the unit.

Air and water move through this Seaton soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high. Organic matter content is moderately low. Reaction in the subsoil is strongly acid to slightly acid. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are wooded. The soil is well suited to woodland and woodland wildlife habitat. It is poorly suited to hay and pasture and as a site for dwellings, septic tank absorption fields, and local roads and streets. It is unsuited to cultivated crops.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help

to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of this soil as a site for dwellings or septic tank absorption fields. Cutting and filling help to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIe.

274G—Seaton silt loam, 30 to 50 percent slopes. This soil is steep and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 15 to 100 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 5 inches thick. The subsurface layer is brown and dark grayish brown, friable silt loam about 5 inches thick. The subsoil is friable silt loam and extends to a depth of 60 inches or more. The upper part of the subsoil is brown. The middle part is dark yellowish brown. The lower part is yellowish brown. In some areas the subsoil contains more sand or is silty clay loam. In some other areas calcareous silt loam is within 40 inches of the surface. In places the subsoil is silty clay loam.

Included with this soil in mapping are small areas of exposed bedrock. Included areas make up 2 to 5 percent of the unit.

Air and water move through this Seaton soil at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high. Organic matter content is moderately low. Reaction in the subsoil is medium acid or slightly acid. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are wooded. This soil is well suited to woodland and woodland wildlife habitat. It is poorly suited as a site for local roads and streets. It is unsuited to cultivated crops and hay and pasture because of the erosion hazard. It is unsuited as a site for dwellings and septic tank absorption fields because of the slope.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

The land capability classification is VIIe.

278—Stronghurst silt loam. This soil is nearly level and somewhat poorly drained. It is on upland divides. The areas are irregular in shape and range from 5 to 90 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 9 inches thick. The subsurface layer is grayish brown, friable silt loam about 5 inches thick. The subsoil is mottled, friable silty clay loam about 39 inches thick. The upper part of the subsoil is yellowish brown. The middle part is brown. The lower part is light brownish gray. The underlying material is light brownish gray, mottled, friable silt loam to a depth of 60 inches or more. In some areas the surface layer is darker. In some other areas the upper part of the subsoil is free of mottles.

Included with this soil in mapping are small areas of well drained Fayette soils on the more sloping parts of the landscape. Included soils make up 3 to 10 percent of the unit.

Air and water move through this Stronghurst soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderately low. Reaction in the subsoil ranges from medium acid to slightly acid, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface becomes crusty.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and pasture and hay. It is moderately suited to woodland. It is poorly suited as a site for local roads and streets, dwellings, and septic tank absorption fields.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface

tile drains, for example, are suitable if outlets are available. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and reduce crusting.

If this soil is used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Subsurface tile drains will help to overcome the wetness. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is IIw.

279A—Rozetta silt loam, 0 to 2 percent slopes. This soil is nearly level and moderately well drained. It is on upland divides and ridgetops. The areas are irregular in shape and range from 3 to 150 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 7 inches thick. The subsurface layer is brown, friable silt loam about 4 inches thick. The subsoil is friable and is about 41 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam. The middle part is dark yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silt loam. The underlying material is brown, mottled, friable silt loam to a depth of 60 inches or more. In some areas the surface layer is darker. In some other areas, there are no mottles in the upper 30 inches or the part of the soil immediately below the surface layer is gray.

Included with this soil in mapping are small areas of poorly drained Rushville soils in shallow depressions that are subject to ponding. Included soils make up 5 to 8 percent of the unit.

Air and water move through this Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4 to 6 feet below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction in the subsoil ranges from very strongly acid to medium acid, and the surface layer commonly is neutral because of liming. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture and hay, and woodland. It is moderately suited as a site for dwellings with basements and for septic tank absorption fields. It is poorly suited as a site for local roads and streets.

In areas used for corn, soybeans, or small grain, keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and reduce crusting.

In areas of this soil used for pasture and hay, overgrazing reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is I.

279B—Rozetta silt loam, 2 to 5 percent slopes. This soil is gently sloping and moderately well drained. It is on upland divides and ridgetops. The areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is brown, friable silt loam about 7 inches thick. The subsurface layer is brown, friable silt loam about 2 inches thick. The subsoil is yellowish brown, firm silty clay loam to a depth of 60 inches or more. It is mottled below a depth of about 26 inches. In some areas the surface layer is darker. In some other areas, the subsoil has no mottles or the part of the soil immediately below the surface layer is gray.

Included with this soil in mapping are small areas of somewhat poorly drained Fishhook soils on the more sloping parts of the landscape. Included soils make up 2 to 5 percent of the unit.

Air and water move through this Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4 to 6 feet below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction in the subsoil ranges from very strongly acid to medium acid, and the surface layer commonly is neutral because of liming. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture and hay, and woodland. It is moderately suited as a site for dwellings with basements and for septic tank absorption fields. It is poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is IIe.

279C2—Rozetta silt loam, 5 to 10 percent slopes, eroded. This soil is sloping and moderately well drained. It is on upland divides, ridgetops, and side slopes along drainageways. The areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is mixed brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil is friable and is about 45 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam. The middle part is yellowish brown, mottled silty clay loam. The lower part is yellowish brown, mottled silt loam. The underlying material is yellowish brown, mottled, friable silt loam to a depth of 60 inches or more. In some areas the surface layer is silty clay loam or is darker. In some other areas calcareous silt loam is within 40 inches of the surface. In places the subsoil contains more sand.

Included with this soil in mapping are small areas of somewhat poorly drained Keomah and Atlas soils and well drained Ursa soils. The Keomah soils are on the less sloping positions. The Atlas and Ursa soils are on the more sloping positions. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4 to 6 feet below the surface. Available water capacity is high. Organic matter content is moderately low. Reaction in the subsoil ranges from very strongly acid to medium acid, and the surface layer commonly is neutral because of liming. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture and hay, and woodland. It is moderately suited as a site for dwellings with basements and for septic tank absorption fields. It is poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is IIIe.

279C3—Rozetta silty clay loam, 5 to 10 percent slopes, severely eroded. This soil is sloping and moderately well drained. It is on upland divides, ridgetops, and side slopes along drainageways. The areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silty clay loam about 7 inches thick. The subsoil is friable silty clay loam about 35 inches thick. The upper part of the subsoil is dark yellowish brown. The lower part is yellowish brown and mottled. The underlying material is yellowish brown, mottled, friable silt loam to a depth of 60 inches or more. In some areas the surface layer is silt loam. In some other areas, calcareous silt loam is within 40 inches of the surface or the subsoil contains more sand.

Included with this soil in mapping are small areas of somewhat poorly drained Atlas and Keomah soils and well drained Ursa soils. The Atlas and Ursa soils are in the more sloping areas. The Keomah soils are in the less sloping areas. Included soils make up 5 to 8 percent of the unit.

Air and water move through this Rozetta soil at a moderate rate. Surface runoff is medium in cultivated areas. A seasonal high water table is 4 to 6 feet below the surface. Available water capacity is very high. Organic matter content is low. Reaction in the subsoil ranges from strongly acid to medium acid, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops. It is moderately suited to pasture and hay and as a site for dwellings and septic tank absorption fields. It is poorly suited as a site for local roads and streets. It is well suited to woodland.

Erosion is a hazard in areas used for corn, soybeans, or small grain. Terraces, conservation tillage systems that leave crop residue on the surface after planting, contour farming, and a crop rotation that includes several years of forage crops will help to control erosion. Incorporating additional organic matter into the soil helps to improve tilth and reduce crusting.

In areas of this soil used for pasture and hay, overgrazing reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table limits this soil as a site for septic tank absorption fields. Underground drains adjacent to the absorption field help to overcome the wetness.

The land capability classification is IVe.

280B—Fayette silt loam, 2 to 5 percent slopes. This soil is gently sloping and well drained. It is on ridgetops. The areas are irregular in shape and range from 3 to 200 acres.

Typically, the surface layer is dark grayish brown, friable silt loam about 8 inches thick. The subsurface layer is brown and dark grayish brown, friable silt loam about 4 inches thick. The subsoil is firm, silty clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is brown. The middle part is dark yellowish brown. The lower part is yellowish brown and mottled. In some places the surface layer is darker. In some other places the subsoil has gray mottles at a depth of less than 30 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Stronghurst soils on the less sloping parts of the landscape. Included soils make up 3 to 6 percent of the unit.

Air and water move through this Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. Reaction in the subsoil ranges from strongly acid to neutral, and the surface layer commonly is neutral or slightly acid because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture and hay, and woodland. It is well suited as a site for septic tank absorption fields, moderately suited as a site for dwellings, and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

280C2—Fayette silt loam, 5 to 10 percent slopes, eroded. This soil is sloping and well drained. It is on ridgetops, on shoulder slopes, and on side slopes along drainageways. The areas are irregular in shape and range from 5 to 100 acres.

Typically, the surface layer is mixed brown and dark yellowish brown, friable silt loam about 7 inches thick. The subsoil is dark yellowish brown and friable and is about 45 inches thick. The upper part of the subsoil is silty clay loam, and the lower part is silt loam. The underlying material is dark yellowish brown, friable silt loam to a depth of 60 inches or more. In some places, the surface layer contains more clay or calcareous silt loam is within 40 inches of the surface. In some other places the subsoil has gray mottles at a depth of less than 30 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Keomah and Stronghurst soils on the less sloping parts of the landscape. Included soils make up 3 to 6 percent of the unit.

Air and water move through this Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. Reaction in the subsoil ranges from medium acid to neutral, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate. The potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and well suited to woodland and to pasture and hay. It is well suited as a site for septic tank absorption fields, moderately suited as a site for dwellings, and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion (fig. 8).

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

280C3—Fayette silty clay loam, 5 to 10 percent slopes, severely eroded. This soil is sloping and well drained. It is on ridgetops, on shoulder slopes, and on side slopes along drainageways. The areas are irregular in shape and range from 3 to 150 acres.

Typically, the surface layer is yellowish brown, friable silty clay loam about 6 inches thick. The subsoil is friable and is about 36 inches thick. The upper part of the subsoil is yellowish brown silty clay loam. The middle part is dark yellowish brown silty clay loam. The lower part is dark yellowish brown silt loam. The underlying material is dark yellowish brown, friable silt loam to a depth of 60 inches or more. In some areas the surface layer is silt loam. In some other areas, calcareous silt loam is within 40 inches of the surface or the subsoil has gray mottles at a depth of less than 30 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Keomah and Stronghurst soils on the less sloping parts of the landscape. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Fayette soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. Reaction in the subsoil ranges from medium acid to neutral, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate. The potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops and moderately suited to pasture and hay. It is well suited to woodland and as a site for septic tank absorption fields. It is moderately suited as a site for dwellings and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas used for corn, soybeans, or small grain. Terraces, conservation tillage systems that leave crop residue on the surface after planting, contour farming, and a crop rotation that includes

Figure 8.—A grassed ridge terrace, contour farming, and crop residue on Fayette silt loam, 5 to 10 percent slopes, eroded.

several years of forage crops will help to control erosion. Incorporating additional organic matter into the soil helps to improve tilth and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. A good seedbed is difficult to prepare on this soil because of surface crusting and the tendency of the soil to become cloddy.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings, especially those without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IVe.

280D2—Fayette silt loam, 10 to 15 percent slopes, eroded. This soil is strongly sloping and well drained. It is on shoulder slopes and side slopes along drainageways. The areas are long and narrow and range from 3 to 80 acres.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silt loam about 6 inches thick. The subsoil is friable and is about 49 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam. The middle part is dark yellowish brown silty clay loam. The lower part is yellowish brown silt loam. The underlying material is yellowish brown, friable silt loam to a depth of 60 inches or more. In some areas the soil contains less clay or more sand. In some other areas calcareous silt loam is within 40 inches of the surface.

Included with this soil in mapping are small areas of somewhat poorly drained Atlas soils and well drained Ursa soils. The Ursa soils are slowly permeable and have more clay in the lower part of the subsoil than this Fayette soil. Included soils make up about 3 to 7 percent of the unit.

Air and water move through this Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. Reaction is strongly acid or medium acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. After hard rains, the surface layer becomes crusty.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and well suited to woodland and to pasture and hay. It is moderately suited as a site for septic tank absorption fields and dwellings and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas used for corn, soybeans, or small grain. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion, maintain tilth, and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion (fig. 9). Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential limits this soil as a site for dwellings, especially those without basements. Slope is an additional limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

Slope is a limitation of this soil as a site for septic tank absorption fields. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IIIe.

280D3—Fayette silty clay loam, 10 to 15 percent slopes, severely eroded. This soil is strongly sloping and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 5 to 100 acres.

Typically, the surface layer is mixed dark brown and dark yellowish brown, friable silty clay loam about 5 inches thick. The subsoil is dark yellowish brown and friable and is about 42 inches thick. The upper part of the subsoil is silty clay loam. The lower part is silt loam. The underlying material is dark yellowish brown and dark brown, friable silt loam to a depth of 60 inches or more. In some places, the surface layer is silt loam or the subsoil contains less clay. In some other places, calcareous silt loam is within 40 inches of the surface or there is more sand throughout the profile.

Included with this soil in mapping are small areas of somewhat poorly drained Atlas soils and well drained Ursa soils. The Ursa soils have slow permeability and contain more clay in the subsoil than this Fayette soil. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Fayette soil at a moderate rate. Surface runoff is rapid in cultivated areas. Available water capacity is very high. Organic matter content is low. Reaction is strongly acid or medium acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops, moderately suited to pasture and hay, and well suited to woodland. It is moderately suited as a site for septic tank absorption fields and dwellings and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. A crop rotation dominated by forage crops, contour farming, and a conservation tillage system that leaves crop residue on the surface after planting will help to control erosion. Incorporating organic matter into the soil helps to reduce crusting and improve tilth.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

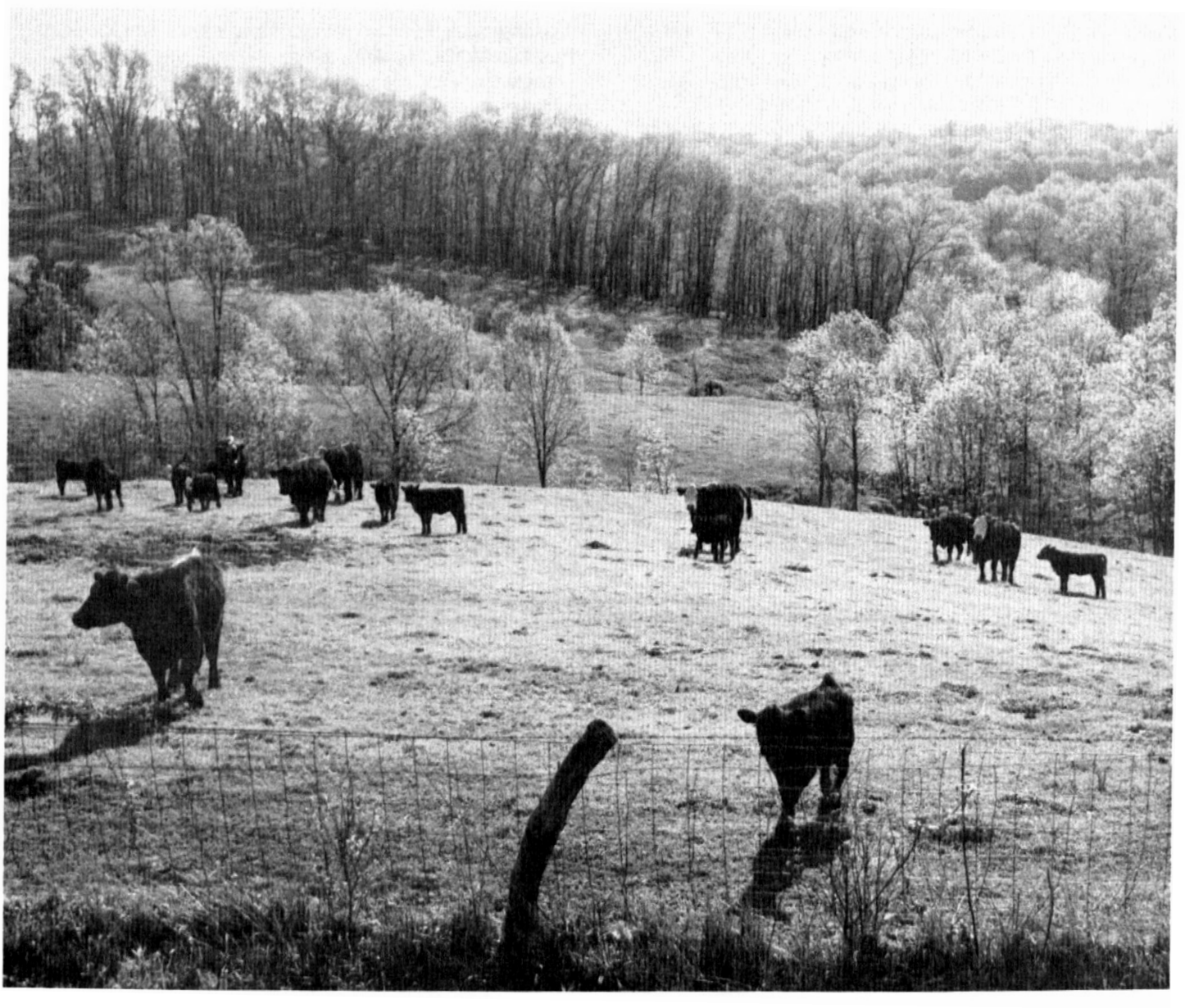


Figure 9.—Grazing on Fayette silt loam, 10 to 15 percent slopes, eroded, in the foreground.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential limits this soil as a site for dwellings, especially those without basements. Slope is an additional limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

Slope is a limitation of this soil as a site for septic tank absorption fields. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IVe.

284—Tice silt loam. This soil is nearly level and poorly drained. It is on flood plains that are frequently

flooded for brief periods from March to May. The areas are irregular in shape and range from 5 to 1,000 acres.

Typically, the surface layer is dark brown, friable silt loam about 12 inches thick. The subsoil is mottled, friable silt loam about 37 inches thick. The upper part of the subsoil is brown, and the lower part is light brownish gray. The underlying material is light brownish gray, friable silt loam to a depth of 60 inches or more. In some places the surface layer contains more clay or is thicker than 24 inches. In other places the part of the soil immediately below the surface layer is gray.

Included with this soil in mapping are small areas of well drained Raddle soils and somewhat poorly drained Wagner soils. The Raddle soils are in the slightly higher positions. The Wagner soils are on low terraces. Included soils make up 10 to 15 percent of the unit.

Air and water move through this Tice soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderate. Reaction ranges from medium acid to neutral in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and woodland. Because it is subject to flooding, it is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, flooding is a hazard in some years. This soil is not frequently flooded during the growing season. Levees reduce the extent of the crop damage caused by floodwater. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

When this soil is flooded, it furnishes temporary feeding and resting sites for waterfowl.

The land capability classification is IIIw.

331A—Haymond silt loam, 0 to 3 percent slopes. This soil is nearly level and well drained. It is on flood plains that are frequently flooded for brief periods from March to May. The areas are long and narrow and range from 15 to 200 acres.

Typically, the surface layer is brown, friable silt loam about 8 inches thick. The subsoil is mainly brown, friable silt loam to a depth of 60 inches or more. The lower part has thin strata of loamy sand.

Included with this soil in mapping are small areas of somewhat poorly drained Coffeen and Wakeland soils at the lower positions. Included soils make up 5 to 8 percent of the unit.

Air and water move through this Haymond soil at a moderate rate. Surface runoff is slow in cultivated areas. Available water capacity is very high. Organic matter content is moderately low. Reaction is neutral throughout the surface layer and subsoil. The shrink-swell potential is low. The potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, hay, pasture, and woodland. Because it is subject to flooding, it is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, flooding is a hazard in some years. This soil is not frequently flooded during the growing season. Levees reduce the extent of the crop damage caused by floodwater. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

In areas used for pasture and hay, overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Levees help to reduce the damage caused by floodwater in some years. Proper stocking rates, rotation grazing, and deferred grazing when soil is wet help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIw.

333—Wakeland silt loam. This soil is nearly level and somewhat poorly drained. It is on flood plains that are frequently flooded for brief periods from March to May. The areas are irregular in shape and range from 5 to 150 acres.

Typically, the surface layer is dark grayish brown, mottled, friable silt loam about 8 inches thick. The underlying material is friable and mottled and extends to a depth of 60 inches or more. The upper part is dark grayish brown silt loam. The lower part is grayish brown, stratified silt loam, fine sandy loam, and gravelly loam. In some areas the soil contains more sand throughout. In some other areas the surface layer or the underlying material is darker.

Included with this soil in mapping are small areas of well drained Haymond soils at the higher positions. Also included are small areas of somewhat poorly drained Kendall soils at the higher positions on terraces that are not flooded. Included soils make up 3 to 6 percent of the unit.

Air and water move through this Wakeland soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderately low. Reaction is neutral in the underlying material and the surface layer. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and woodland. Because it is subject to flooding, it is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain. Flooding is a hazard in some years, but the soil is not frequently flooded during the growing season. Subsurface tile drains help to overcome the effects of the seasonal high water table. Levees help to reduce the extent of the crop damage caused by the floodwaters. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIw.

336—Wilbur silt loam. This soil is nearly level and moderately well drained. It is on flood plains that are rarely flooded. The areas are irregular in shape and range from 10 to 200 acres.

Typically, the surface layer is brown, friable silt loam about 9 inches thick. The underlying material is mottled, friable silt loam to a depth of 60 inches or more. The upper part is brown, and the lower part is dark grayish brown. In some areas, the surface layer is darker or the soil contains more sand. In some other areas the underlying material is darker.

Air and water move through this soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1.5 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderately low. Reaction is neutral throughout the profile. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and woodland. Because it is subject to flooding, it is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

If this soil is used for corn, soybeans, or small grain, keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is I.

386B—Downs silt loam, 2 to 5 percent slopes. This soil is gently sloping and well drained. It is on upland divides and ridgetops. The areas are irregular in shape and range from 5 to 60 acres.

Typically, the surface layer is dark brown, friable silt loam about 9 inches thick. The subsoil is friable and extends to a depth of 60 inches or more. The upper part of the subsoil is brown and dark yellowish brown silty clay loam. The lower part is dark yellowish brown silt loam. In some areas the lower part of the subsoil is mottled. In some other areas the surface layer is thinner or is not so dark.

Included with this soil in mapping are small areas of somewhat poorly drained, nearly level Atterberry and Stronghurst soils. Included soils make up 2 to 5 percent of the unit.

Air and water move through this Downs soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderate. Reaction in the subsoil is slightly acid or neutral, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential is moderate, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, pasture, hay, and woodland. It is well suited as a site for septic tank absorption fields, moderately suited as a site for dwellings, and poorly suited as a site for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking

rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

404—Titus silty clay loam. This soil is nearly level and poorly drained. It is on flood plains that are rarely flooded and occasionally ponded for brief periods in early spring. The areas are irregular in shape and range from 4 to 300 acres.

Typically, the surface layer is black, firm silty clay loam about 8 inches thick. The subsurface layer is black, mottled, firm silty clay loam about 10 inches thick. The subsoil is mottled and extends to a depth of 60 inches or more. The upper part of the subsoil is olive gray, firm silty clay loam, and the lower part is grayish brown, friable silty clay loam. In some areas the surface layer and subsurface layer have a combined thickness of more than 24 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Coffeen and Orion soils on the slightly higher elevations. Included soils make up 6 to 10 percent of the unit.

Air and water move through this Titus soil at a slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table ranges from 6 inches above the surface to 2 feet below the surface. Available water capacity and organic matter content are high. Reaction in the subsoil is neutral or mildly alkaline, and the surface layer is neutral. The shrink-swell potential and the potential for frost action are high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops. It is well suited to woodland. Because it is subject to flooding and occasional ponding, the soil is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

Most areas of this soil have been sufficiently drained for corn, soybeans, and small grain, but measures that maintain or improve drainage are needed. Subsurface tile drains and surface inlet tile are suitable. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity and increase the rate of water intake.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and causes seedling mortality and a windthrow hazard. Plant competition is a management concern. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. Using a harvesting method that does not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIIw.

415—Orion silt loam. This soil is nearly level and somewhat poorly drained. It is on flood plains that are rarely flooded. The areas are irregular in shape and range from 10 to 90 acres.

Typically, the surface layer is brown, friable silt loam about 5 inches thick. The underlying material is friable and extends to a depth of 60 inches or more. The upper part is brown and dark grayish brown, mottled silt loam. The middle part is very dark gray silt loam and silty clay loam. The lower part is dark gray, mottled silty clay loam. In some areas the dark colored layer is nearer the surface or is not in the soil. In some other areas the lower part of the underlying material contains more clay.

Included with this soil in mapping are small areas of poorly drained Titus soils at the lower positions. Included soils make up 5 to 8 percent of the unit.

Air and water move through this Orion soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderately low. Reaction is neutral throughout the profile. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. It is moderately suited to woodland. Because it is subject to flooding, the soil is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, wetness from flooding and the seasonal high water table delays planting in some years. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and plant competition is a management concern. The use of

equipment is limited to periods when the soil is firm and dry. The competition from undesirable vegetation in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is IIw.

428—Coffeen silt loam. This soil is nearly level and somewhat poorly drained. It is on flood plains that are rarely flooded. The areas are irregular in shape and range from 7 to 300 acres.

Typically, the surface soil is dark brown, friable silt loam about 15 inches thick. The subsoil is mottled and friable and is about 27 inches thick. It mainly is brown, grayish brown, and dark grayish brown silt loam and has thin strata of loam, fine sandy loam, and loamy fine sand. The underlying material is mottled and friable and extends to a depth of 60 inches or more. It is grayish brown and dark grayish brown silt loam and has thin strata of loam and fine sandy loam. In some places the surface layer contains more clay. In some other places the soil is dark to a depth of more than 24 inches.

Included with this soil in mapping are small areas of well drained Raddle soils at the slightly higher positions. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Coffeen soil at a moderate rate. Surface runoff is slow in cultivated areas. A seasonal high water table is 1 to 3 feet below the surface. Available water capacity is very high. Organic matter content is moderate. Reaction is neutral in the subsoil, and the surface layer is slightly acid. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops and moderately suited to woodland. Because it is subject to flooding, the soil is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil used for corn, soybeans, or small grain, wetness from flooding and the seasonal high water table delays planting in some years. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and plant competition is a management concern. The use of equipment is limited to periods when the soil is firm and dry. The competition from undesirable vegetation in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The land capability classification is I.

430B—Raddle silt loam, 1 to 5 percent slopes. This soil is gently sloping and well drained. It is on foot slopes of uplands. It is rarely flooded. The areas are irregular in shape and range from 5 to 80 acres.

Typically, the surface soil is very dark grayish brown, friable silt loam about 17 inches thick. The subsoil is friable silt loam and extends to a depth of 60 inches or more. The upper part of the subsoil is brown. The lower part is dark yellowish brown. In some areas the soil contains more sand throughout.

Included with this soil in mapping are small areas of somewhat poorly drained Coffeen, Orion, and Wakeland soils on the slightly lower positions. Also included are areas with slopes of up to 8 percent. In some areas bedrock is at a depth of less than 30 inches. Included areas make up 2 to 7 percent of the unit.

Air and water move through this Raddle soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is very high. Organic matter content is moderate. Reaction is neutral throughout the profile. The shrink-swell potential is low, and the potential for frost action is high.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops. Because it is subject to rare flooding, the soil is poorly suited as a site for local roads and streets, moderately suited as a site for septic tank absorption fields, generally unsuited as a site for dwellings.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces (fig. 10), and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

The land capability classification is IIe.

470C—Keller silt loam, 5 to 10 percent slopes. This soil is sloping and somewhat poorly drained. It is on side slopes along drainageways. The areas are long and narrow and range from 3 to 80 acres.

Typically, the surface soil is very dark grayish brown, friable silt loam about 13 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part of the subsoil is very dark grayish brown, firm silty clay loam. The middle part is dark grayish brown and grayish brown, mottled, firm silty clay loam. The lower part is dark gray, gray, and light gray, very firm and firm silty clay loam. In some areas the surface soil is thinner and is mixed with subsoil material.

Included with this soil in mapping are small areas of somewhat poorly drained Ipava and Herrick soils on the less sloping parts of the landscape. Included soils make up 5 to 7 percent of the unit.

Figure 10.—A grassed back terrace on Raddle silt loam, 1 to 5 percent slopes.

Air and water move through this Keller soil at a moderate rate in upper part of the subsoil and at a slow rate in the lower part of the soil. Surface runoff is medium in cultivated areas. A perched seasonal high water table is 1 to 3 feet below the surface. Available water capacity is high. Organic matter content is moderate. Reaction ranges from medium acid to neutral in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and well suited to pasture and hay. It is poorly suited as a site for septic tank absorption fields, dwellings, and local roads and streets.

In some areas used for corn, soybeans, or small grain, hillside seepage delays planting and reduces yields and erosion is a hazard. Subsurface drainage helps remove excess water. Terraces, a conservation tillage system that leaves crop residue on the surface after planting, and contour farming help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing or grazing when the soil is too wet reduces forage production and causes surface compaction, excessive runoff, and poor tilth. Proper stocking rates, rotation grazing, and deferred grazing when the soil is wet help keep the soil and pasture in good condition.

The shrink-swell potential and seasonal high water table limit this soil as a site for dwellings. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Using underground drains controls the water table.

The seasonal high water table and slow permeability limit this soil as a site for septic tank absorption fields. Subsurface tile drains higher on the side slope than the absorption field will intercept seepage water. Increasing the size of the filter field or replacing the soil with more permeable material helps overcome the slow permeability.

The land capability classification is IIIe.

551F—Gosport silty clay loam, 15 to 30 percent slopes. This soil is moderately deep, moderately steep, and moderately well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 7 to 120 acres.

Typically, the surface layer is very dark grayish brown, friable silty clay loam about 3 inches thick. The subsurface layer is yellowish brown, friable silt loam about 2 inches thick. The subsoil is firm and is about 22 inches thick. The upper part of the subsoil is yellowish brown silty clay loam. The middle part is yellowish brown silty clay. The lower part is light olive brown shaly silty clay. Light olive brown clay shale is at a depth of about 27 inches. In places the clay shale is at a depth of less than 20 inches.

Included with this soil in mapping are small areas of well drained Haymond and Hickory soils, moderately well drained Rozetta soils, and somewhat poorly drained Wakeland soils. The Haymond and Wakeland soils are on the flood plains below the Gosport soil. The Hickory and Gosport soils are on similar positions. The Rozetta soils are less sloping than and above the Gosport soil. None of those soils is underlain by clay shale. Included soils make up 8 to 10 percent of the unit.

Air and water move through this Gosport soil at a very slow rate. Surface runoff is rapid in wooded areas. Available water capacity is moderate. Organic matter content is moderately low. Reaction is strongly acid in the subsoil. Rooting depth is restricted by the shale bedrock at a depth of 20 to 40 inches. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas of this soil are wooded. The soil is unsuited to cultivated crops and poorly suited to woodland. It is moderately suited to woodland wildlife habitat and unsuited as a site for dwellings, septic tank absorption fields, and local roads and streets.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high and windthrow is a hazard because of the high clay content of the soil. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. Using harvesting methods that do not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

The land capability classification is VIIe.

551G—Gosport silty clay loam, 30 to 50 percent slopes. This soil is moderately deep, steep, and moderately well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 7 to 200 acres.

Typically, the surface layer is dark grayish brown, friable silty clay loam about 3 inches thick. The subsurface layer is light olive brown, firm silty clay loam about 3 inches thick. The subsoil is firm and is about 24 inches thick. It is light olive brown, firm silty clay loam in the upper part and light olive brown, mottled shaly silty clay in the lower part. Grayish brown clay shale is at a depth of about 30 inches. In some areas the shale is at a depth of less than 20 inches or more than 40 inches.

Included with this soil in mapping are small areas of well drained Haymond and Hickory soils, moderately well drained Rozetta soils, and somewhat poorly drained Wakeland soils. The Haymond and Wakeland soils are on the flood plains below the Gosport soil. The Rozetta soils are on the less sloping positions above the Gosport soil. Included soils make up 8 to 12 percent of the unit.

Air and water move through this Gosport soil at a very slow rate. Surface runoff is rapid in wooded areas. Available water capacity is moderate. Organic matter content is moderately low. Reaction is strongly acid in the subsoil. Rooting depth is restricted by the shale bedrock at a depth of 20 to 40 inches. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas of this soil are wooded. The soil is unsuited to cultivated crops and is poorly suited to woodland and as a site for local roads and streets. It is moderately suited to woodland wildlife habitat and is unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high and windthrow is a hazard because of the high clay content of the soil. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper

slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. Using harvesting methods that do not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this soil provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

The land capability classification is VIIe.

570B—Martinsville loam, 2 to 5 percent slopes. This soil is gently sloping and well drained. It is on high stream terraces. The areas are irregular in shape and range from about 5 to 60 acres.

Typically, the surface layer is dark brown, friable loam about 8 inches thick. The subsoil is friable and extends to a depth of 60 inches or more. The upper part of the subsoil is brown loam. The middle part is dark yellowish brown clay loam. The lower part is yellowish brown silt loam. In some areas, the soil contains less sand throughout or the surface layer contains more sand.

Included with this soil in mapping are small areas of somewhat poorly drained, nearly level Kendall soils. Included soils make up about 4 to 7 percent of the unit.

Air and water move through this Martinsville soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. Reaction is slightly acid or neutral in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are moderate.

Most areas of this soil are cultivated. The soil is well suited to cultivated crops, hay and pasture, and woodland and is well suited as a site for dwellings with basements and for septic tank absorption fields. It is moderately suited as a site for dwellings without basements and for local roads and streets.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIe.

570C2—Martinsville loam, 5 to 10 percent slopes, eroded. This soil is sloping and well drained. It is on high stream terraces. The areas are irregular in shape and range from 15 to 65 acres.

Typically, the surface layer is mixed brown and yellowish brown, friable loam about 9 inches thick. The subsoil is friable and extends to a depth of 60 inches or more. The upper part of the subsoil is yellowish brown clay loam, loam, sandy loam, and loamy sand. The lower part is yellowish brown and light brownish gray, mottled, stratified silt loam, loam, and loamy sand. In some areas the surface layer contains more sand or is clay loam. In some other areas the soil contains less sand throughout.

Included with this soil in mapping are small areas of somewhat poorly drained, nearly level Kendall soils. Included soils make up about 2 to 5 percent of the unit.

Air and water move through this Martinsville soil at a moderate rate. Surface runoff is medium in cultivated areas. Available water capacity is high. Organic matter content is moderately low. Reaction is medium acid or strongly acid in the subsoil, and the surface layer commonly is neutral because of past liming practices. The shrink-swell potential and the potential for frost action are moderate.

Most areas of this soil are cultivated. The soil is moderately suited to cultivated crops and is well suited to hay and pasture and woodland. It is moderately suited as a site for dwellings and local roads and streets and well suited as a site for septic tank absorption fields.

Erosion is a hazard in areas of this soil used for corn, soybeans, or small grain. Contour farming, terraces, and a conservation tillage system that leaves crop residue on the surface after planting help to maintain tilth and reduce crusting and erosion.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition.

The main management concern on woodland is the effect of plant competition on new desirable seedlings. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential is a limitation of this soil as a site for dwellings without basements. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling.

The land capability classification is IIIe.

605D2—Ursa loam, 10 to 15 percent slopes, eroded. This soil is strongly sloping and well drained. It is on side slopes along drainageways. The areas are long and narrow and range from 5 to 20 acres.

Typically, the surface layer is mixed dark grayish brown and yellowish brown, friable loam about 7 inches thick. The subsoil is yellowish brown and extends to a depth of 60 inches or more. The upper part of the subsoil is friable loam. The middle part is firm clay loam. The lower part is mottled, firm clay loam. In some places the soil contains less sand or more sand. In some other places the soil is gray near the surface.

Included with this soil in mapping are small areas of moderately well drained, moderately deep Gosport soils. These soils are on side slopes downslope from the Ursa soil. They make up 5 to 10 percent of the unit.

Air and water move through this Ursa soil at a slow rate. Surface runoff is rapid in cultivated areas. Available water capacity is high. Organic matter content is moderately low. Reaction ranges from strongly acid to neutral in the subsoil, and the surface layer is medium acid. The shrink-swell potential is high, and the potential for frost action is moderate.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops and moderately suited to hay and pasture and woodland. It is poorly suited as a site for dwellings, septic tank absorption fields, and local roads and streets.

Erosion is a hazard in areas used for corn, soybeans, or small grain. A crop rotation dominated by forage crops and a combination of contour farming and a conservation tillage system that leaves crop residue on the surface after planting help to control erosion, maintain tilth, and reduce crusting.

Establishing pasture plants or hay on this soil helps to control erosion. Overgrazing reduces forage yields and causes excessive runoff and erosion. Proper stocking rates and rotation grazing help keep the soil and pasture in good condition. Tilling the pasture on the contour when a seedbed is prepared or the pasture is renovated helps to control erosion.

In the areas of this soil used for woodland, control of livestock is needed to prevent reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The shrink-swell potential limits this soil as a site for dwellings, especially those without basements. Slope is an additional limitation. Reinforcing foundations helps to prevent the structural damage caused by shrinking and swelling. Cutting and filling help to overcome the slope.

Slope and the slow permeability limit this soil as a site for septic tank absorption field. Enlarging the absorption area helps to overcome the slow permeability. Installing the filter lines on the contour helps to overcome the slope.

The land capability classification is IVe.

800B—Psamments, gently sloping. These soils are coarse textured and excessively drained. They formed in material dredged from the Illinois River. In places slopes are more than 3 percent. The unit occurs as a long and narrow area less than 200 acres in size. It is rarely flooded.

Typically, the soil material is sand or loamy sand and 10 to 15 percent of the material is calcareous shell fragments. The soil material has small pockets of silt loam or silty clay loam.

Available water capacity is low. Organic matter content and the plant nutrient content are very low.

Most areas of this unit are idle. A few areas are wooded or have sparse vegetation. The unit is a probable source of sand.

This unit is not assigned a land capability classification.

806F—Orthents, clayey-skeletal, hilly. These soils are fine textured and moderately well drained. They consist of material that has been modified by filling and earth moving during coal mining. In most areas the material is clayey shale mixed with variable amounts of loamy glacial till and some loess. Slopes range from 12 to 45 percent. The areas are irregular in shape and range from 10 to 60 acres.

Available water capacity varies but is generally moderate. Permeability also varies because the soils have been compacted by construction equipment and because of textural differences.

Most areas of these soils are idle. The plant cover ranges from none in newly exposed areas to a dense cover of trees and brush in older areas.

Onsite investigation is needed to determine the limitations and suitability for specific uses.

This unit is not assigned a land capability classification.

864—Pits, quarries. This unit consists of quarries where limestone bedrock has been removed or broken

and stockpiled. The soil material generally is dolomitic limestone that ranges in size from sand to boulders. Slopes range from nearly level on the quarry floor to nearly vertical on the quarry face. The areas are irregular in shape and range from 3 to 80 acres in size.

Most areas of this unit that are not being excavated are idle. The idle areas have potential for recreation. Some areas that have water in the excavation have potential as habitat for fish and waterfowl or for fishing and swimming.

This unit is not assigned a land capability classification.

865—Pits, gravel. This unit consists of excavations from which gravel and some sand have been removed. The material is generally sandy or gravelly and has a few large stones. Slopes range from nearly level to steep. The areas are irregular in shape and range from 3 to 40 acres. The excavations are commonly 10 to 70 feet deep. The surrounding soil material generally was scraped or mixed when the sand and gravel were mined.

Most areas of this unit that are not being excavated are idle. Additions of loamy soil material and plant nutrients are generally needed if vegetation is to be established. The feasibility of reclamation depends on the condition at the site and the proposed use. Onsite investigation is needed to determine the suitability for a specific use.

This unit is not assigned a land capability classification.

937F—Seaton-Hickory complex, 15 to 30 percent slopes. This unit consists of moderately steep, well drained soils on side slopes along drainageways. The areas are long and narrow and range from 15 to 100 acres in size. They are about 50 to 60 percent Seaton soil and 40 to 50 percent Hickory soil. The Seaton soil is on upslope positions, and the Hickory soil is on downslope positions. The areas of the two soils are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Seaton soil is dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is dark grayish brown, friable silt loam about 3 inches thick. The subsoil is friable silt loam about 38 inches thick. The upper part of the subsoil is dark yellowish brown, and the lower part is dark brown. The underlying material is dark brown, friable silt loam to a depth of 60 inches or more. In some areas the subsoil is silty clay loam. In some other areas calcareous silt loam is within a depth of 40 inches.

Typically, the surface layer of the Hickory soil is brown, friable loam about 3 inches thick. The subsurface layer is brown, friable loam about 4 inches thick. The subsoil is friable and is about 41 inches thick. The upper part of the subsoil is brown and dark yellowish brown loam. The next part is dark yellowish brown clay loam. The lower part is dark yellowish brown and yellowish brown, mottled clay loam. The underlying material is yellowish brown, mottled, friable, calcareous loam to a depth of 60 inches or more. In some areas the surface layer is silt loam. In some other areas the subsoil contains more sand.

Included with these soils in mapping are small areas of exposed limestone and shale bedrock. Included areas make up about 2 to 5 percent of the unit.

Air and water move through these Seaton and Hickory soils at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high in the Seaton soil and high in the Hickory soil. Organic matter content is moderately low in both soils. Reaction in the subsoil is medium acid or slightly acid in the Seaton soil and strongly acid or medium acid in the Hickory soil. The shrink-swell potential is low in the Seaton soil and moderate in the Hickory soil. The potential for frost action is high in the Seaton soil and moderate in the Hickory soil.

Most areas of this unit are wooded. These soils are well suited to woodland and to woodland wildlife habitat. They are poorly suited to hay and pasture and as sites for local roads and streets, dwellings, and septic tank absorption fields. The soils are unsuited to cultivated crops.

In areas of this unit used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

The wooded areas of these soils provide habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of these soils as sites for dwellings or septic tank absorption fields. Cutting and filling help to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIe.

937G—Seaton-Hickory silt loams, 30 to 50 percent slopes. This unit consists of steep, well drained soils on side slopes along drainageways. The areas are long and narrow and range from 10 to 100 acres. They are about 50 to 60 percent Seaton soil and 40 to 50 percent Hickory soil. The Seaton soil is on upslope positions, and the Hickory soil is on downslope positions. The areas of the two soils are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Seaton soil is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is brown, friable silt loam about 5 inches thick. The subsoil is yellowish brown, friable silt loam about 34 inches thick. The underlying material is brown, mottled, friable silt loam to a depth of 60 inches or more. In some areas the subsoil is silty clay loam. In some other areas calcareous silt loam is within 40 inches of the surface.

Typically, the surface layer of the Hickory soil is very dark grayish brown, friable silt loam about 4 inches thick. The subsurface layer is dark brown, friable silt loam about 4 inches thick. The subsoil extends to a depth of about 60 inches. The upper part of the subsoil is dark yellowish brown, friable silt loam. The next part is dark yellowish brown and strong brown, firm clay loam. The lower part is yellowish brown, mottled, firm clay loam. In some areas the soil contains more sand.

Included with these soils in mapping are small areas of exposed bedrock. Included areas make up about 2 to 5 percent of the unit.

Air and water move through these Seaton and Hickory soils at a moderate rate. Surface runoff is rapid in wooded areas. Available water capacity is very high in the Seaton soil and high in the Hickory soil. Organic matter content is moderately low in both soils. Reaction in the subsoil ranges from strongly acid to neutral in the Seaton soil and is strongly acid or medium acid in the Hickory soil. The shrink-swell potential is low in the Seaton soil and moderate in the Hickory soil. The potential for frost action is high in the Seaton soil and moderate in the Hickory soil.

Most areas of this unit are wooded. These soils are well suited to woodland and woodland wildlife habitat. Because of the slope and erosion hazard, they are generally unsuited to cultivated crops, to hay and pasture, and as sites for dwellings and septic tank absorption fields.

In areas of this unit used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this unit provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

The land capability classification is VIIe.

967F—Hickory-Gosport complex, 15 to 30 percent slopes. This unit consists of moderately steep soils on side slopes along drainageways. The areas are long and narrow and range from 10 to 80 acres. They are about 60 to 65 percent deep, well drained Hickory soil and 35 to 40 percent moderately deep, moderately well drained Gosport soil. The Hickory soil is in upslope positions, and the Gosport soil is in downslope positions. The areas of the two soils are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Hickory soil is very dark grayish brown, friable silt loam about 2 inches thick. The subsurface layer is friable and is about 8 inches thick. The upper part of the subsurface layer is dark brown silt loam. The lower part is yellowish brown loam. The subsoil is yellowish brown, friable clay loam to a depth of 60 inches or more. In some areas the surface layer and subsurface layer are loam. In some other areas the soil contains more sand or less sand.

Typically, the surface layer of the Gosport soil is mixed very dark grayish brown and yellowish brown, friable loam about 3 inches thick. The subsurface layer is yellowish brown, friable loam about 3 inches thick. The subsoil is about 33 inches thick. The upper part of the subsoil is light olive brown, friable clay loam and silty clay. The lower part is light olive brown and olive, mottled, firm silty clay. Olive gray, mottled, extremely firm clay shale is at a depth of about 39 inches. In some areas the shale is at a depth of more than 40 inches.

Included with these soils in mapping are small areas of somewhat poorly drained Atlas and well drained Ursa soils on the less sloping parts of the landscape. Included soils make up 3 to 6 percent of the unit.

Air and water move through the Hickory soil at a moderate rate and through the Gosport soil at a very slow rate. Surface runoff is rapid in wooded areas of both soils. Available water capacity is high in the Hickory soil and moderate in the Gosport soil. Organic matter content is moderately low in both soils. Reaction in the subsoil is strongly acid or medium acid in the Hickory soil and strongly acid or very strongly acid in the Gosport

soil. Rooting depth is restricted in the Gosport soil by the shale bedrock at a depth of 20 to 40 inches. The shrink-swell potential is moderate in the Hickory soil and high in the Gosport soil. The potential for frost action is moderate in both soils.

Most areas of this unit are wooded. The Hickory soil is well suited to woodland and woodland wildlife habitat. The Gosport soil is poorly suited to woodland and moderately suited to woodland wildlife habitat. The Hickory soil is poorly suited as a site for dwellings and septic tank absorption fields. The Gosport soil is generally unsuited as a site for dwellings and septic tank absorption fields because of the slope and depth to bedrock.

In areas of this unit used for woodland, slope causes an erosion hazard and limits the use of equipment. Seedling mortality is high, and plant competition is a hazard for desirable seedlings. Four main practices help to control erosion: (1) placing logging roads and skid trails on the contour; (2) on the steeper slopes, skidding logs or trees uphill with a cable and winch; (3) using grass firebreaks; (4) seeding bare areas to grass or to a grass-legume mixture after logging operations have been completed. The use of machinery is limited to periods when the soil is firm. Planting mature stock and clearing all vegetation within 2 feet of the planted seedlings help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

In wooded areas this unit provides habitat for deer, wild turkey, squirrel, and other woodland wildlife. Plantings for food and cover are difficult to establish and maintain because of the slope and hazard of erosion.

Slope is the major limitation of these soils as sites for dwellings or septic tank absorption fields. Cutting and filling help to overcome the slope at building sites. Installing the filter lines on the contour helps to overcome the slope in areas used as sites for septic tanks.

The land capability classification is VIIe.

1404—Titus silty clay loam, wet. This soil is nearly level and poorly drained. It is on flood plains. It is frequently flooded or ponded for brief periods from March to June (fig. 11). The areas are irregular in shape and range from 25 to 350 acres.

Typically, the surface layer is very dark gray, mottled, friable and firm silty clay loam about 12 inches thick. The subsoil is mottled, firm silty clay loam and extends to a depth of 60 inches or more. The upper part of the subsoil is dark gray. The middle part is gray. The lower part is dark gray. In some areas the soil contains less clay. In some other areas the surface layer is thicker than 24 inches.

Included with this soil in mapping are small areas of somewhat poorly drained Coffeen, Orion, and Wakeland soils at the slightly higher positions. Included soils make up 8 to 12 percent of the unit.

Air and water move through this Titus soil at a slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table ranges from 6 inches above the surface to 2 feet below the surface. Available water capacity and organic matter content are high. Reaction is slightly acid or neutral in the subsoil, and the surface layer is slightly acid. The shrink-swell potential and the potential for frost action are high.

Most areas of this soil are used for wetland wildlife habitat. The soil is well suited to wetland wildlife habitat and woodland. Because it is subject to flooding, it is poorly suited as a site for local roads and streets and unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and causes seedling mortality and a windthrow hazard. Plant competition is a management concern. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. Using a harvesting method that does not leave isolated or widely spaced trees and removing only high-value trees from a 50-foot-wide strip along the west and south edges of the woodland help to reduce windthrow. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

When this soil is ponded, it furnishes temporary feeding and resting sites for waterfowl. Shallow water areas can be developed easily.

The land capability classification is Vw.

3070—Beaucoup silty clay loam, frequently flooded. This soil is nearly level and poorly drained. It is on flood plains that are frequently flooded and occasionally ponded for brief periods from March to June. The areas are irregular in shape and range from 4 to 160 acres.

Typically, the surface layer is very dark gray, friable silty clay loam about 4 inches thick. The subsurface layer is very dark grayish brown, friable silty clay loam about 7 inches thick. The subsoil is mottled, friable silty clay loam to a depth of 60 inches or more. The upper part is very dark grayish brown. The lower part is dark gray and gray. In some places, the surface layer is silt loam or the soil is dark colored to a depth of more than 24 inches. In

Figure 11.—Flooding on Titus silty clay loam, wet.

some other places the surface layer and subsoil are silty clay with up to 45 percent clay.

Included with this soil in mapping are small areas of poorly drained and very poorly drained Darwin soils in the lower positions. Included soils make up 3 to 5 percent of the unit.

Air and water move through this Beaucoup soil at a moderately slow rate. Surface runoff is slow or ponded in cultivated areas. A seasonal high water table ranges from 6 inches above the surface to 2 feet below the surface. Available water capacity and organic matter content are high. Reaction is slightly acid or neutral in the subsoil, and the surface layer is neutral. The shrink-swell potential is moderate, and the potential for frost action is high. The surface layer becomes cloddy if it is tilled when wet.

Most areas of this soil are cultivated. The soil is poorly suited to cultivated crops and well suited to woodland. Because it is subject to flooding, the soil is poorly suited as a site for local roads and streets and generally unsuited as a site for dwellings and septic tank absorption fields.

In areas of this soil is used for corn, soybeans, or small grain, flooding is a hazard and the seasonal high water table is a limitation. Measures that maintain or improve the drainage system, such as subsurface tile drains, are needed. Levees reduce the crop damage caused by flooding. Keeping tillage to a minimum and leaving crop residue on the surface after planting help to maintain tilth and productivity.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. The competition from undesirable plants in openings created

by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

When this soil is flooded, it furnishes temporary feeding and resting sites for waterfowl. Shallow water areas can be easily developed.

The land capability classification is IVw.

4071—Darwin silty clay, ponded. This soil is nearly level and very poorly drained. It is on flood plains that are frequently flooded or ponded for long periods, mainly from January to June. Some areas are ponded for much of the year. The areas are irregular in shape and range from 20 to 100 acres.

Typically, the surface layer is very dark gray, mottled, firm silty clay about 20 inches thick. The subsoil is dark gray and gray, mottled, firm silty clay to a depth of 60 inches or more. In places the surface layer is thicker than 24 inches.

Included with this soil in mapping are small areas of poorly drained Beaucoup soils on the slightly higher positions. Included soils make up 5 to 10 percent of the unit.

Air and water move through this Darwin soil at a very slow rate. Surface runoff is slow or ponded. A seasonal high water table ranges from 1 foot above the surface to 2 feet below the surface. Available water capacity and organic matter content are moderate. Reaction is slightly acid or neutral in the subsoil and surface layer.

Most areas of this soil are used for wildlife habitat. The soil is well suited to wetland wildlife habitat. Because it is subject to flooding, it is poorly suited as a site for local roads and streets and is unsuited as a site for dwellings and septic tank absorption fields. It is moderately suited to woodland.

In areas of this soil used for woodland, the seasonal high water table limits the use of equipment and seedling mortality and plant competition are management concerns. The use of equipment is limited to periods when the soil is firm. Planting mature stock and planting on ridges help to reduce seedling mortality. The competition from undesirable plants in openings created by timber harvesting can be reduced by chemical or mechanical means. Controlling livestock prevents reduction or destruction of the leaf mulch and of desirable young trees, compaction of the soil, and damage to tree roots. Protection from fire prevents injury to trees and maintains the leaf mulch.

When this soil is ponded, it furnishes temporary feeding and resting sites for waterfowl.

The land capability classification is Vw.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to food, feed, forage, fiber, and oilseed crops. It may be cultivated land, pasture, woodland, or other land, but it is not urban and built-up land or water areas. It either is used for food or fiber crops or is available for those crops. The soil qualities, growing season, and moisture supply are those needed for a well managed soil to produce a sustained high yield of crops in an economic manner. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The level of acidity or alkalinity is acceptable. Prime farmland has few or no rocks and is permeable to water and air. It is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Soil Conservation Service.

About 87,769 acres in Brown County, or nearly 45 percent of the total acreage, meets the requirements for prime farmland. Associations 1, 2, and 7 on the general soil map have the highest percentage, but small acreages of prime farmland also occur in the other associations. Most of the prime farmland is cultivated. Corn, soybeans, wheat, and hay are the main crops.

The map units in Brown County that are considered prime farmland are listed in table 5. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Soils that have limitations, such as a seasonal high water table, frequent flooding during the growing season, or inadequate rainfall, qualify for prime farmland only in areas where these limitations have been overcome by such measures as drainage, flood control, or irrigation. The need for these measures is indicated after the map unit name in table 5. Onsite evaluation is needed to determine whether these limitations have been

overcome by corrective measures. In Brown County most of the naturally wet soils have been adequately drained.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

William Kuenstler, area agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the University of Illinois Cooperative Extension Service.

About 140,000 acres is used for cropland and pasture in Brown County. Crops such as corn, soybeans, wheat, and hay cover about 90,000 acres, and about 50,000 acres is used as permanent pasture (*11*). The total acreage of cropland and pasture has stayed about the same for the last 10 years. However, the acreage of different crops has changed. There are fewer acres of wheat, oats, and hay and more acres of corn and soybeans than there were 10 years ago.

This switch to more intensive cropping systems has increased the hazard of sheet and rill erosion on sloping cropland. On about 75 percent of the cropland, erosion exceeds 4 tons per acre per year (*5*). Erosion is a major hazard on Fayette, Hickory, Keomah, Sylvan, Rozetta, and other soils with slopes of more than 2 percent.

Erosion is damaging for three reasons. First, the top 4 to 6 inches, which contains the major portion of the nutrient and water supplying volume of the soil, is lost. Second, tillage incorporates soil with poor tilth into the plow layer. Third, erosion results in sediment in waterways, ponds, streams, and lakes, causing increased costs for dredging, water treatment, and terrace and waterway maintenance.

Loss of the surface layer is particularly damaging on Atlas, Elco, Fishhook, and Keller soils, all of which have a subsoil of clay loam.

Several conservation practices can be used to reduce erosion and runoff and increase infiltration on gently sloping and sloping soils. Examples are a conservation tillage system that leaves crop residue on the surface after planting, terraces, and contour farming.

Conservation tillage results in 43 to 77 percent less erosion than fall plowing, depending on the type of tillage system used. The greatest erosion control is achieved with no-tillage, in which all crop residue is left on the surface. The least effective conservation tillage system is one that uses a chisel plow, disk, or field cultivator to prepare the seedbed, leaving only about 30 percent of the surface covered with crop residue. In all

types of conservation tillage, the key to erosion control is leaving crop residue on the soil after planting. The most erosive rainfalls occur during the period from planting time (in the early and middle parts of May) until the crop forms a protective canopy. If a conventional seedbed is prepared, the soil is bare and loose and susceptible to erosion. The crop residue used in a conservation tillage system protects the soil from the rain and reduces erosion and runoff.

All the soils in Brown County that are suitable as cropland are suitable for a conservation tillage system that uses some tillage, such as chisel plowing, disking, and field cultivating. However, not all the soils are suited to no-tillage. Soils that are nearly level and poorly drained, such as Beaucoup, Darwin, Rushville, Titus, and Virden soils, stay wet and cool longer in the spring. Therefore, germination and growth are sometimes slowed with no-tillage. In some areas with long slopes, conservation tillage alone will not control erosion, and terraces or diversions, which reduce slope length, are necessary. Soils with slopes of mainly more than 10 percent are too steep for terracing, and they generally have short, irregular slopes that are not suited to terracing. Where terraces are not feasible, a crop rotation that includes small grain, hay, and pasture helps to reduce erosion. Also, grassed waterways and grade stabilization structures commonly are needed to ensure that runoff does not cause gully erosion.

Wetness is a concern in many soils. These soils are so flat or impermeable that water cannot move off or through them. Beaucoup, Darwin, Rushville, Titus, and Virden soils, for example, are poorly drained and have a high water table. Somewhat poorly drained Clarksdale, Ipava, and Keomah soils have enough slope to allow surface water to run off, but not quickly enough to avoid some wetness.

All of the poorly drained and somewhat poorly drained soils need some type of artificial drainage. For some of the poorly drained soils, surface ditches or tile inlets are needed to dispose of surface water and subsurface drainage tile is needed to lower the water table. For some somewhat poorly drained soils, tile is all that is needed. The design of the drainage system will vary according to soil permeability, or the rate at which water moves through the soil. For example, drains should be closer together on soils with slower permeability, such as Darwin, Keomah, Titus, and Virden soils. Some sloping soils have seep spots after heavy rains. Some areas of sloping Elco, Fishhook, and Keller soils, for example, need tiling to eliminate seep areas.

Soil fertility is a major concern affecting any type of crop production. Most of the soils in Brown County have a medium to high level of natural fertility. Applications of limestone will raise the reaction to a level suitable for crop production. The content of available phosphorus and potash is medium to high in most of the soils.

Soil tilth is important for seed germination, water infiltration, and response to tillage. Soils that are porous and have a granular structure in the surface layer have good tilth. The amount of organic matter in the soil affects tilth. Most of the soils in Brown County have low to moderate levels of organic matter. Soils with low levels of organic matter have poor tilth. Keomah, Fayette, Stronghurst, Rushville, and Rozetta soils are examples. A crust forms on their surface after intense rainfall if the soils are unprotected. The crusted surface slows water infiltration and retards crop emergence. Minimum tillage or no-tillage helps to keep this crust from forming. The crop residue on the soil surface absorbs the impact of the raindrops and helps increase organic matter content in the surface layer, thus gradually improving tilth.

Fall moldboard plowing can have beneficial effects on some of the poorly drained soils with a high organic matter content. Beaucoup, Darwin, Titus, and Virden soils, for example, dry out slowly in the spring and will get hard and cloddy if tilled when wet. Fall tillage allows the freezing and thawing in winter to break down the clods, but fall-tilled soils should be protected from wind erosion, which is also a hazard during dry, windy spring weather.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents (*4*). Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (*9*). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed Soil Map Units" and in the yields table.

Woodland Management and Productivity

Woodland makes up about 38,000 acres, or 20 percent of the county (*11*). This woodland is almost entirely privately owned. Much of it is in areas that are too steep, too wet, or too remote for farming. The soils in these areas vary widely in their potential for trees of high quality.

The largest areas of woodland are in associations 3, 4, and 5 on the general soil map. The main upland forest types are white, red, and black oak; hickory; white ash; hard maple; and elm. Cherry, walnut, and basswood are in isolated areas. On the bottom lands of associations 6 and 7, the forests are generally made up of cottonwood, soft maple, sycamore, and pin oak. Other species are green ash, river birch, willow, hackberry, boxelder, locust, and bur oak.

Most of the woodland would benefit from removal of undesirable trees and undesirable species. Many timber stands in the county are understocked with desirable species or have none at all and can be improved by interplanting or total conversion to desirable tree species. Protection from livestock grazing, fire, insects, and disease will ensure the future of the timber resource, reduce or prevent soil erosion, and make existing woodland more productive.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for an indicator species. The number indicates the volume, in cubic meters per hectare per year, which the indicator species can produce. The number 1 indicates low potential productivity; 2 and 3, moderate; 4 and 5, moderately high; 6 to 8, high; 9 to 11, very high; and 12 to 39, extremely high. The second part of the symbol, a letter, indicates the major kind of soil limitation. The

letter *R* indicates steep slopes; *X*, stoniness or rockiness; *W*, excessive water in or on the soil; *T*, toxic substances in the soil; *D*, restricted rooting depth; *C*, clay in the upper part of the soil; *S*, sandy texture; and *F*, a high content of rock fragments in the soil. The letter *A* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: R, X, W, T, D, C, S, and F.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitation to be considered in management.

Erosion hazard is the probability that damage will occur as a result of site preparation and cutting where the soil is exposed along roads, skid trails, fire lanes, and log-handling areas. Forests that have been burned or overgrazed are also subject to erosion. Ratings of the erosion hazard are based on the percent of the slope. A rating of *slight* indicates that no particular prevention measures are needed under ordinary conditions. A rating of *moderate* indicates that erosion-control measures are needed in certain silvicultural activities. A rating of *severe* indicates that special precautions are needed to control erosion in most silvicultural activities.

Equipment limitation reflects the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. The chief characteristics and conditions considered in the ratings are slope, stones on the surface, rock outcrops, soil wetness, and texture of the surface layer. A rating of *slight* indicates that under normal conditions the kind of equipment or season of use is not significantly restricted by soil factors. Soil wetness can restrict equipment use, but the wet period does not exceed 1 month. A rating of *moderate* indicates that equipment use is moderately restricted because of one or more soil factors. If the soil is wet, the wetness restricts equipment use for a period of 1 to 3 months. A rating of *severe* indicates that equipment use is severely restricted either as to the kind of equipment that can be used or the season of use. If the soil is wet, the wetness restricts equipment use for more than 3 months.

Seedling mortality refers to the death of naturally occurring or planted tree seedlings, as influenced by the kinds of soil, soil wetness, or topographic conditions. The factors used in rating the soils for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, effective rooting depth, and slope aspect. A rating of *slight* indicates that seedling mortality is not likely to be a problem under normal conditions. Expected mortality is less than 25 percent. A rating of *moderate* indicates that some problems from seedling mortality can be expected. Extra precautions are advisable. Expected mortality is 25 to 50 percent. A rating of *severe* indicates that seedling mortality is a serious problem. Extra precautions are important. Replanting may be necessary. Expected mortality is more than 50 percent.

Windthrow hazard is the likelihood that trees will be uprooted by the wind because the soil is not deep enough for adequate root anchorage. The main restrictions that affect rooting are a seasonal high water table and the depth to bedrock, a fragipan, or other limiting layers. A rating of *slight* indicates that under normal conditions no trees are blown down by the wind. Strong winds may damage trees, but they do not uproot them. A rating of *moderate* indicates that some trees can be blown down during periods when the soil is wet and winds are moderate or strong. A rating of *severe* indicates that many trees can be blown down during these periods.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index* and as a *volume* number. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The *volume*, a number, is the yield likely to be produced by the most important trees. This number, expressed as cubic feet per acre per year, indicates the amount of fiber produced on a fully stocked, even-aged, unmanaged stand.

The first species listed under *common trees* for a soil is the indicator species for that soil. It is the dominant species on the soil and the one that determines the ordination class.

Trees to plant are those that are suitable for commercial wood production.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 8 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 8 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a commercial nursery.

Recreation

The main recreation facilities in the county are Siloam Springs State Park, of which slightly over 1,300 acres is in Brown County; Lake Mount Sterling; a campground near LaGrange Lock and Dam; a church camp; a Girl Scout camp; and about 1,200 privately owned ponds. These facilities and the major rivers provide opportunities for hunting, fishing, camping, hiking, canoeing, and boating.

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Brown County is the habitat for a substantial population of game and nongame species of fish and wildlife. Associations 3 and 5 on the general soil map have large areas of habitat for woodland wildlife species, such as whitetail deer, gray and fox squirrel, turkeys, and songbirds. Areas of cropland in associations 1, 2, and 4 provide food and cover for many types of openland wildlife, such as cottontail rabbits, woodchucks, bobwhite quail, and mourning doves. Wet areas in associations 6 and 7 provide habitat for waterfowl and beavers and muskrats. Some 1,200 privately owned ponds throughout the county provide habitat for game fish, such as bass, bluegill, and crappie (*3*).

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can

be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, and oats.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bromegrass, soybeans, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and wheatgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, muskrat, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are

given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil),

shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent. Large stones interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

The landfill must be able to bear heavy vehicular traffic. It involves a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect landfills.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during the wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a

landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 18.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to absorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the

susceptibility of soil to wind erosion. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.
7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.
8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to two hydrologic groups in table 17, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs, on the average, once or less in 2 years; and *frequent* that it occurs, on the average, more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Engineering Index Test Data

Table 18 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are representative of the series described in the section "Soil Series and Their Morphology." The soil samples were tested by the Bureau of Materials, Illinois Department of Transportation.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*10*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud*, meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Hapludalfs.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the underlying material can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*8*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*10*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Atlas Series

The Atlas series consists of somewhat poorly drained, very slowly permeable soils on glacial till plains. These soils formed in fine textured paleosols covered with up to 20 inches of loess or pedisediment. Slopes range from 10 to 15 percent.

Atlas soils are similar to Fishhook soils and are commonly adjacent to Elco, Fishhook, Hickory, Rozetta, and Ursa soils. The Atlas soils and the Elco, Fishhook, and Ursa soils are on similar landscape positions, but the Elco, Fishhook, and Ursa soils have higher chroma in the upper part of the argillic horizon. The Rozetta soils

have less clay and sand in the control section than the Atlas soils and are less sloping. The Hickory soils are steeper than the Atlas soils and have less clay in the control section.

Typical pedon of Atlas silt loam, 10 to 15 percent slopes, eroded, 335 feet south and 995 feet east of the northwest corner of sec. 18, T. 1 S., R. 4 W.:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many roots; strongly acid; abrupt smooth boundary.

2Bt1—7 to 12 inches; brown (10YR 5/3) clay loam; moderate very fine angular blocky structure; firm; common roots; many distinct dark grayish brown (10YR 4/2) clay films and few distinct white (10YR 8/1) silt coatings on faces of peds; very strongly acid; clear smooth boundary.

2Btg1—12 to 17 inches; light brownish gray (10YR 6/2) clay loam; common fine faint brown (10YR 5/3) mottles; moderate medium angular blocky structure; very firm; common roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; clear smooth boundary.

2Btg2—17 to 28 inches; grayish brown (2.5Y 5/2) clay loam; common fine distinct light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure; very firm; few roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; very strongly acid; gradual smooth boundary.

2Btg3—28 to 39 inches; olive gray (5Y 5/2) and light olive gray (5Y 6/2) clay loam; few fine prominent light yellowish brown (2.5Y 6/4) mottles; moderate medium prismatic structure; very firm; few roots; slightly acid; gradual smooth boundary.

2Btg4—39 to 51 inches; gray (5Y 5/1) clay loam; few fine prominent light olive brown (2.5Y 5/4) mottles; moderate medium prismatic structure; firm; neutral; gradual wavy boundary.

2Btg5—51 to 60 inches; gray (5Y 5/1) clay loam; common medium prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure; firm; neutral.

The A horizon has chroma of 2 or 3. It is mainly silt loam, but in severely eroded areas it is silty clay loam or clay loam. The 2Bt horizon is clay loam, silty clay loam, or clay. It has chroma of 1 to 3. It ranges from very strongly acid to mildly alkaline.

Atterberry Series

The Atterberry series consists of somewhat poorly drained, moderately permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 2 percent.

Atterberry soils are similar to Kendall and Stronghurst soils and are commonly adjacent to Downs, Fayette, Rozetta, and Stronghurst soils. Well drained Downs and Fayette soils and moderately well drained Rozetta soils are more sloping than Atterberry soils. Kendall and Stronghurst soils have a lighter colored surface layer than Atterberry soils but are on similar landscape positions. Kendall soils have more sand in the lower part of the solum than Atterberry soils.

Typical pedon of Atterberry silt loam, 192 feet east and 48 feet north of the southwest corner of sec. 9, T. 1 S., R. 2 W.:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

E—8 to 12 inches; dark grayish brown (10YR 4/2) silt loam; moderate thin platy structure; friable; few fine roots; neutral; clear smooth boundary.

Bt1—12 to 20 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; few fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt2—20 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt3—30 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles and common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; many distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg1—36 to 48 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles and common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Btg2—48 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles and common fine prominent

yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few distinct dark grayish brown (10YR 4/2) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); very dark gray (10YR 3/1) krotovina; slightly acid.

The thickness of the solum is a least 41 inches. The clay content of the control section averages 30 to 35 percent. The E horizon has value of 4 or 5.

Beaucoup Series

The Beaucoup series consists of poorly drained, moderately slowly permeable soils on flood plains. These soils formed in moderately fine textured alluvium. Slopes range from 0 to 2 percent.

Beaucoup soils are similar to Tice and Titus soils and are commonly adjacent to Coffeen, Darwin, Orion, Tice, and Titus soils. Coffeen and Orion soils are coarse-silty and they and the Beaucoup soils are on similar landscape positions. Darwin and Titus soils are at lower positions than Beaucoup soils and have a fine textured control section. Tice soils are somewhat poorly drained and are at higher landscape positions than Beaucoup soils.

Typical pedon of Beaucoup silty clay loam, 2,530 feet north and 680 feet west of the southeast corner of sec. 22, T. 2 S., R. 2 W.:

Ap—0 to 7 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

A—7 to 11 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; firm; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

AB—11 to 20 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; few fine prominent olive gray (5Y 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg1—20 to 27 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent olive gray (5Y 5/2) mottles and few fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg2—27 to 35 inches; dark gray (5Y 4/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg3—35 to 47 inches; dark gray (5Y 4/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles and few fine prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BCg—47 to 60 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common distinct very dark gray (5Y 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral.

The thickness of the solum is at least 50 inches. The thickness of the mollic epipedon ranges from 15 to 24 inches. The clay content of the control section averages 27 to 35 percent.

The A horizon has value of 2 or 3 and chroma of 1 or 2. The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It is slightly acid or neutral.

Clarksdale Series

The Clarksdale series consists of somewhat poorly drained, moderately slowly permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 5 percent.

Clarksdale soils are similar to Herrick, Ipava, and Keomah soils and are commonly adjacent to Herrick, Ipava, Keomah, Rozetta, and Rushville soils. Herrick and Ipava soils have a mollic epipedon, and they and the Clarksdale soils are on similar landscape positions. Keomah soils have a lighter surface color than the Clarksdale soils and are on similar landscape positions. Rozetta soils are moderately well drained and are more sloping than Clarksdale soils. Rushville soils are poorly drained and are in slight depressions.

Typical pedon of Clarksdale silt loam, 0 to 2 percent slopes, 805 feet east and 425 feet south of the northwest corner of sec. 20, T. 1 S., R. 3 W.:

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; many roots; few fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

E—8 to 12 inches; dark gray (10YR 4/1) silt loam; weak medium platy structure; friable; common roots; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

BE—12 to 16 inches; dark grayish brown (10YR 4/2) and brown (10YR 4/3) silty clay loam; moderate very fine angular blocky structure; firm; common roots; common very dark grayish brown (10YR 3/2) clay films and common faint (10YR 7/2 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt—16 to 22 inches; brown (10YR 5/3) silty clay loam; common fine faint grayish brown (10YR 5/2) mottles and few fine faint yellowish brown (10YR 5/4) mottles; strong fine angular blocky structure; firm; common roots; common distinct dark gray (10YR 4/1) and very dark gray (10YR 3/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Btg1—22 to 31 inches; grayish brown (2.5Y 5/2) silty clay loam; many medium prominent yellowish brown (10YR 5/4) mottles; moderate medium angular blocky structure; firm; common roots; common distinct dark gray (10YR 4/1) and very dark gray (10YR 3/1) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Btg2—31 to 41 inches; light brownish gray (2.5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/4 and 5/6) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; firm; few fine roots; few distinct very dark gray (10YR 3/1) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

Btg3—41 to 51 inches; light olive gray (5Y 6/2) silty clay loam; many medium prominent yellowish brown (10YR 5/4 and 5/6) mottles; weak medium prismatic structure; firm; few fine roots; few distinct very dark gray (10YR 3/1) clay films on faces of peds; few medium dark concretions (iron and manganese oxides); neutral; gradual smooth boundary.

Cg—51 to 60 inches; light olive gray (5Y 6/2) silt loam; common coarse prominent yellowish brown (10YR 5/4 and 5/6) mottles; massive; friable; few distinct very dark gray (10YR 3/1) clay films in root channels; mildly alkaline.

The thickness of the solum is at least 50 inches. The clay content of the control section averages 35 to 42 percent. The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 or 2. The B horizon has hue of 10YR, 5Y, or 2.5Y, value of 5 or 6, and chroma of 1 to 3. It ranges from strongly acid to neutral. The Cg horizon has chroma of 1 or 2.

Coffeen Series

The Coffeen series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in medium textured alluvium. Slopes range from 0 to 2 percent.

Coffeen soils are similar to Orion soils and are commonly adjacent to Beaucoup, Haymond, Orion, Raddle, and Wakeland soils. Beaucoup soils are poorly drained and are in shallow depressions. Haymond and Raddle soils are well drained and are at higher landscape positions than Coffeen soils. Orion and Wakeland soils do not have a mollic epipedon, and they and the Coffeen soils are on similar landscape positions.

Typical pedon of Coffeen silt loam, 2,380 feet west and 2,440 feet south of the northeast corner of sec. 23, T. 2 S., R. 2 W.:

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

A—7 to 15 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; friable; few fine roots; neutral; clear smooth boundary.

Bw1—15 to 22 inches; brown (10YR 4/3) silt loam; many medium faint dark grayish brown (10YR 4/2) mottles and common fine distinct dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; thin strata of grayish brown (10YR 5/2) and dark brown (10YR 3/3) loam, fine sandy loam, and loamy fine sand; few fine and medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bw2—22 to 30 inches; dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) silt loam; common fine distinct strong brown (7.5 YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; thin strata of brown (10YR 4/3) fine sandy loam; few fine and medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg—30 to 42 inches; grayish brown (10YR 5/2) silt loam; common fine faint brown (10YR 5/3) mottles and common fine distinct strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; thin strata of loam; common fine and medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Cg1—42 to 54 inches; grayish brown (10YR 5/2) silt loam; common fine faint brown (10YR 5/3) mottles and common fine distinct dark yellowish brown (10YR 4/6) mottles; massive; friable; few fine roots;

thin strata of loam and fine sandy loam; common fine and medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Cg2—54 to 60 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct strong brown (7.5YR 4/6) mottles; massive; friable; few fine roots; thin grayish brown (10YR 5/2) strata; common fine and medium concretions (iron and manganese oxides); neutral.

The thickness of the solum ranges from 38 to 50 inches. The thickness of the mollic epipedon ranges from 12 to 24 inches. The control section averages less than 18 percent clay and less than 15 percent sand.

The A horizon has value and chroma of 2 or 3. The Bw horizon has value of 4 to 6. It is medium acid to neutral. The Bg horizon has value of 4 to 6 and chroma of 1 or 2. The C horizon has value of 2 to 6 and chroma of 1 or 2. It is neutral to medium acid.

Darwin Series

The Darwin series consists of poorly drained and very poorly drained, very slowly permeable soils on flood plains along the major rivers. These soils formed in fine textured slack-water sediments. Slopes range from 0 to 2 percent.

Darwin soils are similar to Titus soils and are commonly adjacent to Beaucoup, Orion, and Titus soils. Beaucoup and Orion soils have less clay throughout and are on higher landscape positions than Darwin soils. Titus soils have less clay in the control section and are on slightly higher landscape positions than Darwin soils.

Typical pedon of Darwin silty clay, 220 feet north and 1,800 feet east of the southwest corner of sec. 34, T. 2 S., R. 2 W.:

Ap—0 to 9 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; moderate fine granular structure; firm; few fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

AB—9 to 20 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; moderate fine subangular blocky structure; firm; few fine dark concretions (iron and manganese oxides); few fine roots; slightly acid; clear smooth boundary.

Bg1—20 to 26 inches; dark gray (5Y 4/1) silty clay; common fine prominent dark reddish brown (5YR 3/4) mottles; moderate medium subangular blocky structure; firm; common distinct dark gray (5Y 4/1) pressure faces; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg2—26 to 31 inches; gray (5Y 5/1) silty clay; many fine prominent dark reddish brown (5YR 3/4) mottles and few fine prominent dark reddish brown (2.5YR 3/4) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct dark gray (5Y 4/1) pressure faces; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bg3—31 to 49 inches; gray (5Y 5/1) silty clay; many fine prominent dark reddish brown (5YR 3/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; common distinct dark gray (5Y 4/1) pressure faces; common fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BCg—49 to 60 inches; gray (5Y 5/1) silty clay; common fine prominent strong brown (7.5YR 5/8) mottles and common fine prominent dark reddish brown (5YR 3/4) mottles; weak medium subangular blocky structure; firm; few fine roots; common distinct dark gray (5Y4/1) pressure faces; common fine dark concretions (iron and manganese oxides); neutral.

The thickness of the solum is at least 50 inches. The mollic epipedon is 20 to 24 inches thick. The clay content of the control section averages 45 to 55 percent.

The A horizon has value of 2 or 3. The Bg horizon has hue of 2.5Y or 5Y. It is slightly acid or neutral.

Denny Series

The Denny series consists of poorly drained, slowly permeable soils in nearly level areas and closed depressions on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 2 percent.

Denny soils are similar to Rushville soils and commonly are adjacent to Clarksdale, Herrick, Ipava, and Virden soils. Clarksdale, Herrick and Ipava soils are somewhat poorly drained and are at higher landscape positions than Denny soils. Rushville soils have a lighter colored surface layer than Denny soils. Virden soils have a mollic epipedon, and they and Denny soils are on similar landscape poditions.

Typical pedon of Denny silt loam, 450 feet east and 234 feet south of the center of sec. 11, T. 1 S., R. 4 W.:

Ap—0 to 9 inches; mixed very dark grayish brown (10YR 3/2) and gray (10YR 5/1) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

Eg—9 to 15 inches; grayish brown (10YR 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate thin platy structure; friable; few fine roots; few dark concretions (iron and manganese oxides); medium acid; abrupt smooth boundary.

Btg1—15 to 19 inches; gray (10YR 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure;

friable; few fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg2—19 to 26 inches; gray (10YR 5/1) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate fine subangular blocky; firm; few fine roots; many distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg3—26 to 34 inches; gray (10YR 5/1) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Btg4—34 to 47 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/8) mottles and few fine prominent brown (7.5YR 4/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

BC—47 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many fine prominent yellowish brown (10YR 5/8) mottles and few fine prominent brown (7.5YR 4/4) mottles; weak medium prismatic structure; friable; few fine roots; few distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); slightly acid.

The thickness of the solum is at least 55 inches. The clay content of the control section averages 35 to 40 percent.

The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 or 5 and chroma of 1 or 2. The Btg horizon has value of 4 to 6.

Downs Series

The Downs series consists of well drained, moderately permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 2 to 5 percent.

Downs soils are similar to Fayette and Rozetta soils and are commonly adjacent to Atterberry, Fayette, and Rozetta soils. Atterberry soils are somewhat poorly drained and are nearly level. Fayette and Rozetta soils have a lighter colored surface layer than Downs soils and are on landscape positions similar to those of the Downs soils.

Typical pedon of Downs silt loam, 2 to 5 percent slopes, 800 feet north and 460 feet west of the center of sec. 25, T. 1 S., R. 2 W.:

Ap—0 to 9 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

Bt1—9 to 17 inches; brown (10YR 4/3) silty clay loam; strong fine subangular blocky structure; friable; few fine roots; many distinct dark brown (10YR 3/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt2—17 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong medium subangular blocky structure; friable; few fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt3—27 to 38 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct dark brown (10YR 3/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt4—38 to 50 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt5—50 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid.

The thickness of the solum is at least 49 inches. The clay content of the control section ranges from 27 to 33 percent.

The A horizon has chroma of 2 or 3. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It ranges from medium acid to neutral.

El Dara Series

The El Dara series consists of well drained, moderately permeable soils on uplands. These soils formed in coarse textured and moderately coarse textured outwash. Slopes range from 15 to 50 percent.

El Dara soils are similar to Hickory soils and are commonly adjacent to Fayette, Hickory, and Rozetta soils. Hickory soils have less sand throughout than El Dara soils and are on similar landscape positions. Well drained Fayette soils and moderately well drained

Rozetta soils are fine-silty and are on less sloping positions above El Dara soils.

Typical pedon of El Dara fine sandy loam, 30 to 50 percent slopes, 1,190 feet west and 1,400 feet north of the southeast corner of sec. 22, T. 2 S., R. 4 W.:

A—0 to 3 inches; very dark grayish brown (10YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; moderate very fine granular structure; very friable; many fine roots; neutral; abrupt smooth boundary.

E1—3 to 9 inches; brown (10YR 5/3) fine sandy loam, very pale brown (10YR 7/3) dry; weak medium platy structure; very friable; many fine roots; medium acid; gradual smooth boundary.

E2—9 to 14 inches; yellowish brown (10YR 5/4) fine sandy loam, very pale brown (10YR 7/3) dry; weak medium platy structure; very friable; common fine roots; medium acid; clear smooth boundary.

Bt1—14 to 19 inches; brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; friable; common fine roots; medium acid; clear smooth boundary.

Bt2—19 to 28 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium and coarse subangular blocky structure; firm; common fine roots; common prominent reddish brown (5YR 4/4) clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—28 to 36 inches; strong brown (7.5YR 5/6) sandy clay loam; moderate medium and coarse subangular blocky structure; firm; few fine roots; common prominent reddish brown (5YR 4/4) clay films on faces of peds; few dark concretions (iron and manganese oxides); very strongly acid; gradual wavy boundary.

BC—36 to 47 inches; strong brown (7.5YR 5/6) fine sandy loam; weak coarse subangular blocky structure; friable; few fine roots; few dark concretions (iron and manganese oxides); very strongly acid; gradual wavy boundary.

C—47 to 60 inches; strong brown (7.5YR 5/6) loamy sand; weak coarse subangular blocky structure; few dark concretions (iron and manganese oxides); very friable; strongly acid.

The thickness of the solum ranges from 45 to 60 inches. The A horizon has value of 3 or 4. It is mainly fine sandy loam but ranges to silt loam.

Elco Series

The Elco series consists of moderately well drained, moderately slowly permeable soils on loess-covered till plains. These soils formed in 20 to 40 inches of medium textured loess and in the underlying paleosol formed in Illinoian drift. Slopes range from 10 to 15 percent.

Elco soils are similar to Fishhook and Rozetta soils and are commonly adjacent to Atlas, Fishhook, Keomah, Rozetta, and Ursa soils. Fishhook and Keomah soils are somewhat poorly drained and are less sloping than Elco soils. Atlas and Ursa soils have more clay in the control section than Elco soils and have less than 20 inches of loess on top of the till. They and Elco soils are on similar landscape positions. Rozetta soils developed in 60 inches or more of loess and are less sloping than Elco soils.

Typical pedon of Elco silt loam, 10 to 15 percent slopes, 1,500 feet north and 680 feet west of the southeast corner of sec. 4, T. 1 S., R. 3 W.:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

E—7 to 10 inches; brown (10YR 4/3) silt loam; moderate medium platy structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

Bt1—10 to 14 inches; yellowish brown (10YR 5/6) silt loam; moderate fine subangular blocky structure; friable; few fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and many distinct white (10YR 8/2 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt2—14 to 23 inches; yellowish brown (10YR 5/4) silty clay loam; strong fine subangular blocky structure; friable; few fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and many distinct white (10YR 8/2 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt3—23 to 34 inches; yellowish brown (10YR 5/4) silty clay loam; common fine prominent strong brown (7.5YR 5/6) mottles and few fine distinct grayish brown (10YR 5/2) mottles; strong medium subangular blocky structure; firm; few fine roots; many distinct brown (10YR 5/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

2Bt4—34 to 49 inches; brown (10YR 5/3) clay loam; common medium prominent strong brown (7.5YR 5/6) mottles and common medium faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm; few fine roots; few distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); less than 5 percent pebbles; slightly acid; clear smooth boundary.

2Btg—49 to 60 inches; grayish brown (2.5Y 5/2) clay loam; common fine prominent brown (10YR 5/3) mottles and common medium distinct yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; few fine roots; common

distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); less than 5 percent pebbles; neutral.

The clay content of the control section averages 27 to 33 percent. The A horizon has chroma of 2 or 3. In uneroded areas it is silt loam. In severely eroded areas it is silty clay loam. The Bt horizon has value of 4 or 5 and chroma of 4 to 6. The 2Bt horizon is clay loam, silty clay loam, or clay. It has hue of 5Y, 2.5Y, or 10YR, value of 3 to 6, and chroma of 1 to 4.

Fayette Series

The Fayette series consists of well drained, moderately permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 2 to 15 percent.

Fayette soils are similar to Downs, Rozetta, Seaton, and Sylvan soils and are commonly adjacent to Downs, Hickory, Rozetta, Seaton, and Stronghurst soils. Downs soils have a dark surface layer and are gently sloping. Hickory soils are fine-loamy and are steeper than Fayette soils. Rozetta soils are moderately well drained, and they and the Fayette soils are on similar landscape positions. Seaton and Sylvan soils have less clay in the B horizon than Fayette soils and are steeper. Stronghurst soils are somewhat poorly drained and are less sloping than Fayette soils.

Typical pedon of Fayette silt loam, 2 to 5 percent slopes, 805 feet east and 1,215 feet north of the center of sec. 36, T. 2 S., R. 3 W.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common roots; slightly acid; abrupt smooth boundary.

E—8 to 12 inches; brown (10YR 4/3) and dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak medium platy structure parting to weak fine granular; friable; common roots; neutral; clear smooth boundary.

Bt1—12 to 18 inches; brown (10YR 4/3) silty clay loam; moderate fine subangular blocky structure; firm; common roots; few distinct light gray (10YR 7/2 dry) silt coatings on faces of peds and few distinct dark yellowish brown (10YR 4/4) clay films; neutral; clear smooth boundary.

Bt2—18 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam; strong medium subangular blocky structure; firm; common roots; common distinct brown (7.5YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt3—25 to 36 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate coarse subangular and angular blocky structure; firm; common roots; common distinct brown (7.5YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

Bt4—36 to 48 inches; dark yellowish brown (10YR 4/4) silty clay loam; moderate coarse subangular and angular blocky structure; firm; common roots; few distinct brown (7.5YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Bt5—48 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint brown (10YR 5/3) mottles; weak coarse angular blocky structure; firm; few roots; few distinct brown (7.5YR 4/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); strongly acid.

The thickness of the solum is at least 42 inches. The Ap horizon has chroma mainly of 2 or 3. In some severely eroded areas it has chroma of 4. In uneroded areas it is silt loam, and in severely eroded areas it is silty clay loam. The Bt horizon has value of 4 or 5. It ranges from neutral to strongly acid. The C horizon has value of 4 or 5. It ranges from neutral to medium acid.

Fayette soils in map units 280C2 and 280C3 are less acid in the most acid part of the solum than is defined as the range for the series. This difference, however, does not significantly affect the use or behavior of the soils.

Fishhook Series

The Fishhook series consists of somewhat poorly drained soils on till plains. Permeability is moderate in the upper part of the solum and slow in the lower part. These soils formed in 20 to 40 inches of loess and in the underlying paleosol formed in Illinoian drift. Slopes range from 5 to 10 percent.

Fishhook soils are similar to Atlas, Elco, and Keller soils and are commonly adjacent to Atlas, Elco, Keomah, Rozetta, and Ursa soils. Atlas soils have lower chroma in the upper part of the argillic horizon than Fishhook soils and are steeper. Elco and Rozetta soils are moderately well drained. Keller soils have a mollic epipedon. Ursa soils are well drained. Elco and Ursa soils are steeper than the Fishhook soils. Rozetta soils and Fishhook soils are on similar landscape positions. Keomah soils are fine textured and are less sloping than Fishhook soils.

Typical pedon of Fishhook silt loam, 5 to 10 percent slopes, eroded, 1,800 feet south and 360 feet east of the northwest corner of sec. 34, T. 1 N., R. 4 W.:

Ap—0 to 6 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam; moderate fine granular structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

Bt1—6 to 12 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt2—12 to 17 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct dark yellowish brown (10YR 4/4) clay films and common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt3—17 to 26 inches; brown (10YR 5/3) silty clay loam; many fine faint grayish brown (10YR 5/2) mottles and common fine distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct yellowish brown (10YR 5/4) clay films and common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bt4—26 to 32 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/8 and 10YR 5/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct dark grayish brown (10YR 4/2) clay films and common distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

2Btg1—32 to 51 inches; light brownish gray (2.5Y 6/2) clay loam; many medium prominent yellowish brown (10YR 5/4) mottles and common fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; many distinct gray (10YR 5/1) clay films and few distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine and medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

2Btg2—51 to 60 inches; light brownish gray (2.5Y 6/2) clay; many medium prominent yellowish brown (10YR 5/4) mottles and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; many distinct gray (10YR 5/1) clay films and few distinct very pale brown (10YR 7/3 dry) silt coatings on faces of peds; few fine and medium dark concretions (iron and manganese oxides); neutral.

The A horizon has chroma of 2 to 4. It is mainly silt loam, but in eroded areas it is silty clay loam. The Bt horizon ranges from neutral to strongly acid. The 2Bt horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2. It ranges from medium acid to neutral.

Gosport Series

The Gosport series consists of moderately well drained, very slowly permeable soils on uplands. These soils formed in fine textured residuum from shale and a silty or loamy mantle less than 15 inches thick. Slopes range from 15 to 50 percent.

Gosport soils are commonly adjacent to Elco, Hickory, and Rozetta soils, none of which formed in fine textured residuum. Elco and Rozetta soils are fine-silty and are less sloping than Gosport soils. Hickory soils are fine-loamy, and they and the Gosport soils are on similar positions.

Typical pedon of Gosport silty clay loam, 30 to 50 percent slopes, 1,140 feet north and 2,480 feet west of the southeast corner of sec. 9, T. 1 N., R. 4 W.:

A—0 to 3 inches; dark grayish brown (10YR 4/2) silty clay loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; few fine roots; slightly acid; abrupt smooth boundary.

E—3 to 6 inches; light olive brown (2.5Y 5/4) silty clay loam; splotches of olive brown (2.5Y 4/4); weak medium platy structure; firm; few fine roots; few shale fragments; medium acid; clear smooth boundary.

2Bw1—6 to 18 inches; light olive brown (2.5Y 5/4) silty clay; strong medium subangular blocky structure; firm; few fine roots; few clay ironstone and shale channers; strongly acid; clear smooth boundary.

2Bw2—18 to 23 inches; light olive brown (2.5Y 5/4) shaly silty clay; common fine prominent olive gray (5Y 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; strongly acid; clear smooth boundary.

2Bw3—23 to 30 inches; light olive brown (2.5Y 5/4) shaly silty clay; common fine prominent olive gray (5Y 5/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; coatings (iron and manganese oxides) on shale; strongly acid; clear smooth boundary.

2Cr—30 to 60 inches; grayish brown (2.5Y 5/2) clay shale; weak medium platy rock structure; extremely firm; few fine roots; coatings (iron and manganese oxides) on shale; medium acid.

The thickness of the solum and the depth to unweathered shale range from 20 to 40 inches. The clay content of the control section averages 35 to 40 percent.

The A and E horizons are loam, silt loam, or silty clay loam. The A horizon has value of 3 or 4. The Bw horizon is silty clay loam, silty clay, or shaly silty clay. It has hue of 10YR to 5Y and chroma of 3 or 4. It is strongly acid or very strongly acid. The Cr horizon has hue of 2.5Y or 5Y, value of 4 or 5, and chroma of 1 to 3.

Hamburg Series

The Hamburg series consists of somewhat excessively drained, moderately permeable soils on loess-covered uplands. These soils formed in loess. Slopes range from 25 to 50 percent.

Hamburg soils are similar to Seaton soils and are commonly adjacent to Fayette, Hickory, Seaton, and Sylvan soils. Seaton, Sylvan, Hickory, and Fayette soils do not have calcareous material within a depth of 20 inches. Hamburg soils and Hickory, Seaton, and Sylvan soils are on similar landscape positions, and Fayette soils are less sloping.

Typical pedon of Hamburg silt, 25 to 50 percent slopes, 1,660 feet south and 2,280 feet east of the northwest corner of sec. 14, T. 2 S., R. 2 W.:

A—0 to 5 inches; very dark grayish brown (10YR 3/2) silt, brown (10YR 5/3) dry; moderate fine granular structure; friable; few fine roots; common carbonate concretions; strong effervescence; mildly alkaline; clear smooth boundary.

AC—5 to 16 inches; dark brown (10YR 4/3) silt; weak fine granular structure; friable; few fine roots; common carbonate concretions; strong effervescence; mildly alkaline; clear smooth boundary.

C1—16 to 27 inches; dark yellowish brown (10YR 4/4) silt; massive; friable; few fine roots; common carbonate accumulations; strong effervescence; mildly alkaline; clear smooth boundary.

C2—27 to 60 inches; yellowish brown (10YR 5/4) silt; massive; friable; few fine roots; common carbonate accumulations; strong effervescence; mildly alkaline.

The A horizon is silt or silt loam and has value of 3 or 4 and chroma of 2 or 3. The clay content of the control section averages less than 12 percent. The A and C horizons are mildly alkaline or moderately alkaline.

Haymond Series

The Haymond series consists of well drained, moderately permeable soils on flood plains. These soils formed in medium textured alluvium. Slopes range from 0 to 3 percent.

Haymond soils are commonly adjacent to Coffeen and Wakeland soils. Coffeen and Wakeland soils are somewhat poorly drained and are on lower positions on the flood plains than Haymond soils.

Typical pedon of Haymond silt loam, 0 to 3 percent slopes, 1,500 feet east and 1,870 feet south of the northwest corner of sec. 31, T. 2 S., R. 2 W.:

A—0 to 8 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bw1—8 to 12 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bw2—12 to 25 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; few fine roots; 1-inch-thick lens of loamy sand in upper part; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bw3—25 to 46 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure with weak bedding planes evident; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BC—46 to 60 inches; brown (10YR 4/3) silt loam; weak medium subangular blocky structure with weak bedding planes evident; friable; few very fine roots; few fine dark concretions (iron and manganese oxides); neutral.

The thickness of the solum is at least 40 inches. The clay content of the control section averages 10 to 18 percent. The lower part of the Bw horizon is stratified sandy loam, loamy sand, silt loam, or loam.

Herrick Series

The Herrick series consists of somewhat poorly drained, moderately slowly permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 2 percent.

Herrick soils are similar to Clarksdale, Ipava, and Virden soils and are commonly adjacent to Clarksdale, Denny, Ipava, and Virden soils. Clarksdale soils do not have a mollic epipedon, and they and Herrick soils are on similar landscape positions. Ipava soils do not have an E horizon, and they and Herrick soils are on similar positions. Denny and Virden soils are poorly drained and are in lower positions than Herrick soils.

Typical pedon of Herrick silt loam, 271 feet north and 1,808 feet east of the southwest corner of sec. 7, T. 1 S., R. 4 W.:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

A—8 to 12 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak

medium platy structure parting to moderate fine granular; friable; few fine roots; neutral; abrupt smooth boundary.

E—12 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate thin platy structure parting to weak fine granular; friable; few fine roots; common distinct light gray (10YR 7/1) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides) and few fine yellowish brown (10YR 5/8) iron stains; medium acid; clear smooth boundary.

Bt1—18 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct yellowish brown (10YR 5/8) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; few fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt2—22 to 29 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles and many fine faint yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine subangular blocky; firm; many distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); few fine roots; strongly acid; clear smooth boundary.

Bt3—29 to 40 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine prominent yellowish brown (10YR 5/4) and strong brown (7.5YR 5/6) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; many distinct very dark gray (10YR 3/1) clay films on faces of peds and in root channels; common fine and medium dark concretions (iron and manganese oxides); few fine roots; medium acid; clear smooth boundary.

Bt4—40 to 48 inches; yellowish brown (10YR 5/4) silty clay loam; many medium prominent light brownish gray (2.5Y 6/2) mottles and common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common distinct dark gray (10YR 4/1) clay films on faces of peds and very dark gray (10YR 3/1) organic coatings as channel fillings; common fine and medium dark concretions (iron and manganese oxides); few fine roots; medium acid; clear smooth boundary.

Btg—48 to 56 inches; light brownish gray (2.5Y 6/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles and common fine prominent light yellowish brown (10YR 6/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds and very dark gray (10YR 3/1) organic coatings as channel fillings; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

BC—56 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many fine prominent yellowish brown (10YR 5/6) mottles and common fine prominent light yellowish brown (10YR 6/4) mottles; weak medium prismatic structure; friable; few fine roots; few faint dark gray (10YR 4/1) clay films on faces of peds; common distinct very dark gray (10YR 3/1) organic coatings as channel fillings; few fine dark concretions (iron and manganese oxides); medium acid.

The thickness of the solum is at least 50 inches. The thickness of the mollic epipedon ranges from 15 to 20 inches. The clay content of the control section averages 35 to 40 percent.

The A horizon has chroma of 1 or 2. The Bt horizon is strongly acid to slightly acid.

Hickory Series

The Hickory series consists of well drained, moderately permeable soils on till plains. These soils formed in medium textured glacial till and up to 20 inches of overlying loess. Slopes range from 15 to 50 percent.

Hickory soils are similar to El Dara and Martinsville soils and are commonly adjacent to Atlas, Fayette, Gosport, Seaton, and Ursa soils. Atlas and Ursa soils are on upper ends of drainageways and have more clay in the subsoil than the Hickory soils. El Dara and Martinsville soils formed in outwash, and El Dara soils have more sand throughout than the Hickory soils. The Hickory soils and the Fayette, Gosport, and Seaton soils are on similar landscape positions. The Fayette and Seaton soils are fine-silty, and the Gosport soils formed in shale residuum and are fine textured.

Typical pedon of Hickory loam, 15 to 30 percent slopes, 373 feet east and 2,554 feet north of the southwest corner of sec. 29, T. 2 S., R. 3 W.:

Ap—0 to 2 inches; brown (10YR 4/3) loam, light brownish gray (10YR 6/2) dry; moderate very fine granular structure; friable; many roots; medium acid; abrupt smooth boundary.

E—2 to 5 inches; brown (10YR 5/3) loam, pale brown (10YR 6/3) dry; weak medium platy structure parting to weak fine granular; friable; many roots; very strongly acid; abrupt smooth boundary.

Bt1—5 to 11 inches; yellowish brown (10YR 5/4) clay loam; moderate medium very fine subangular blocky structure; firm; common roots; common distinct light gray (10YR 7/1, dry) silt coatings on faces of peds;

few fine dark concretions (iron and manganese oxides); very strongly acid; clear smooth boundary.
Bt2—11 to 16 inches; yellowish brown (10YR 5/6) clay loam; moderate medium angular blocky structure; firm; common roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; clear smooth boundary.
Bt3—16 to 23 inches; yellowish brown (10YR 5/6) clay loam; moderate medium angular blocky structure; very firm; common roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; very strongly acid; gradual smooth boundary.
Bt4—23 to 30 inches; yellowish brown (10YR 5/6) clay loam; moderate coarse angular blocky structure; firm; few roots; common distinct brown (7.5YR 4/4) clay films on faces of peds; strongly acid; gradual smooth boundary.
Bt5—30 to 43 inches; yellowish brown (10YR 5/6) clay loam; moderate coarse angular blocky structure; firm; few distinct brown (7.5YR 4/4) clay films on faces of peds; medium acid; gradual wavy boundary.
BC—43 to 57 inches; yellowish brown (10YR 5/6) loam; weak coarse angular blocky structure; firm; few distinct brown (7.5YR 4/4) clay films on faces of peds; neutral; gradual smooth boundary.
C—57 to 60 inches; yellowish brown (10YR 5/4) loam; massive; firm; mildly alkaline.

The thickness of the solum is at least 55 inches. The clay content of the control section averages 30 to 35 percent.

Some pedons have an A horizon. This horizon has value of 3 or 4. It is loam or silt loam. The E horizon has value of 4 or 5 and chroma of 2 to 4. The Bt horizon has value of 4 or 5 and chroma of 3 to 6. It ranges from medium acid to very strongly acid. The C horizon has value of 4 or 5.

Ipava Series

The Ipava series consists of somewhat poorly drained, moderately slowly permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 5 percent.

Ipava soils are similar to Clarksdale, Herrick, and Virden soils and are commonly adjacent to Clarksdale, Denny, Herrick, and Virden soils. Clarksdale and Herrick soils have an E horizon, and they and Ipava soils are on similar landscape positions. Denny and Virden soils are poorly drained and are at lower positions than Ipava soils.

Typical pedon of Ipava silt loam, 0 to 2 percent slopes, 750 feet north and 1,760 feet east of the southwest corner of sec. 18, T. 1 S., R. 4 W.:

Ap—0 to 8 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; weak thick platy structure parting to moderate very fine and fine granular; friable; common roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.
A—8 to 14 inches; black (10YR 2/1) silt loam, dark gray (10YR 4/1) dry; moderate very fine subangular blocky structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.
BA—14 to 17 inches; very dark gray (10YR 3/1) silty clay loam, gray (10YR 5/1) dry; moderate fine subangular blocky structure; firm; common fine roots; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
Bt—17 to 25 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct yellowish brown (10YR 5/4) mottles and many fine faint brown (10YR 5/3) mottles; moderate medium angular blocky structure; firm; common roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; few fine and medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
Btg1—25 to 35 inches; light brownish gray (10YR 6/2) silty clay loam; many fine distinct yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate medium and coarse angular blocky; firm; common roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
Btg2—35 to 44 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent brownish yellow (10YR 6/6) mottles; weak medium and coarse prismatic structure; firm; few roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); slightly acid; gradual wavy boundary.
BCg—44 to 54 inches; light brownish gray (2.5Y 6/2) silty clay loam; many fine prominent yellowish brown (10YR 5/4) mottles and many fine distinct brown (10YR 5/3) mottles; weak medium and coarse prismatic structure; firm; few distinct very dark gray (10YR 3/1) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); slightly acid; gradual wavy boundary.
Cg—54 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/4) mottles; massive; friable; few distinct very dark gray (10YR 3/1) organic coatings as channel linings; few fine and medium dark concretions (iron and manganese oxides); slightly acid.

The thickness of the solum is at least 54 inches. The mollic epipedon ranges from 10 to 17 inches in

thickness. The clay content of the control section averages 35 to 40 percent.

The Ap horizon has chroma of 1 or 2. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It ranges from neutral to medium acid. The C horizon has hue of 2.5Y or 5Y and chroma of 1 or 2. It is neutral or slightly acid.

Keller Series

The Keller series consists of somewhat poorly drained soils on loess-covered till plains. Permeability is moderate in the upper part of the solum and slow in the paleosol. These soils formed in 20 to 40 inches of loess and in the underlying paleosol formed in Illinoian drift. Slopes range from 5 to 10 percent.

Keller soils are similar to Fishhook soils and are commonly adjacent to Fishhook, Herrick, and Ipava soils. Fishhook soils do not have a mollic epipedon, and they and the Keller soils are on similar landscape positions. Herrick and Ipava soils are less sloping than Keller soils and formed in loess.

Typical pedon of Keller silt loam, 5 to 10 percent slopes, 2,460 feet north and 980 feet east of the southwest corner of sec. 9, T. 1 S., R. 4 W.:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; weak fine granular structure; friable; many fine roots; slightly acid; abrupt smooth boundary.

A—8 to 13 inches; very dark grayish brown (10YR 3/2) silt loam, gray (10YR 5/1) dry; moderate medium granular structure; friable; many fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; medium acid; clear smooth boundary.

BA—13 to 17 inches; very dark grayish brown (10YR 3/2) silty clay loam, gray (10YR 5/1) dry; moderate very fine and fine subangular blocky structure; firm; many fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—17 to 23 inches; dark grayish brown (10YR 4/2) silty clay loam; common fine prominent yellowish brown (10YR 5/4) mottles; moderate medium angular and subangular blocky structure; firm; common fine roots; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; medium acid; clear smooth boundary.

Bt2—23 to 30 inches; grayish brown (10YR 5/2) silty clay loam; many fine distinct brown (10YR 5/3) and yellowish brown (10YR 5/4) mottles; moderate medium and coarse angular blocky structure; firm; common fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; abrupt smooth boundary.

2Btg1—30 to 41 inches; dark gray (5Y 4/1) silty clay loam; few fine prominent brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium and coarse angular blocky; firm; common fine roots; common distinct very dark gray (10YR 3/1) clay films on faces of peds; slightly acid; gradual smooth boundary.

2Btg2—41 to 50 inches; gray (5Y 5/1) silty clay loam; few fine prominent light olive brown (2.5Y 5/4) mottles; weak medium and coarse prismatic structure; very firm; few fine roots; common distinct very dark gray (10YR 3/1) and dark gray (10YR 4/1) clay films on faces of peds; slightly acid; gradual smooth boundary.

2BCg—50 to 60 inches; light gray (5Y 6/1) silty clay loam; few fine prominent light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; very firm; few fine roots; neutral.

The mollic epipedon ranges from 11 to 17 inches in thickness. The clay content of the control section averages 30 to 35 percent.

The Bt horizon has value of 4 or 5. It is medium acid or slightly acid. The 2Bt horizon has hue of 2.5Y or 5Y and chroma of 1 or 2.

Kendall Series

The Kendall series consists of somewhat poorly drained, moderately permeable soils on terraces adjacent to bottom lands. These soils formed in medium textured loess and the underlying outwash. Slopes range from 0 to 3 percent.

Kendall soils are similar to Atterberry and Stronghurst soils and are commonly adjacent to Haymond, Martinsville, and Wakeland soils. Atterberry and Stronghurst soils formed in more than 60 inches of loess and are on uplands. Martinsville soils are well drained and are steeper than Kendall soils. Haymond and Wakeland soils have less clay in the subsoil than Kendall soils and are on flood plains.

Typical pedon of Kendall silt loam, 0 to 3 percent slopes, 920 feet south and 340 feet west of the center of sec. 8, T. 2 S., R. 4 W.:

Ap—0 to 10 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; weak fine granular structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

E—10 to 16 inches; grayish brown (10YR 5/2) silt loam, light gray (2.5Y 7/2) dry; few fine prominent yellowish brown (10YR 5/6) mottles and few fine faint dark grayish brown (10YR 4/2) mottles; moderate medium platy structure; friable; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt1—16 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct grayish brown (10YR 5/2) mottles; moderate medium angular blocky structure; firm; few fine roots; common distinct white (10YR 8/1 dry) silt coatings and many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt2—26 to 36 inches; grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles; moderate coarse angular blocky structure; firm; few fine roots; common distinct grayish brown (10YR 5/2) clay films and few distinct white (10YR 8/1 dry) silt coatings on faces of peds; common fine and medium dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

Bt3—36 to 50 inches; grayish brown (10YR 5/2) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate coarse angular blocky structure; firm; few fine roots; many distinct grayish brown (10YR 5/2) clay films and few distinct white (10YR 8/1 dry) silt coatings on faces of peds; common fine and medium dark concretions (iron and manganese oxides); medium acid; gradual wavy boundary.

2Bt4—50 to 60 inches; yellowish brown (10YR 5/6) silt loam; many medium prominent light brownish gray (2.5Y 6/2) mottles; weak coarse angular blocky structure; firm; few distinct gray (10YR 5/1) clay films on faces of peds; few medium dark concretions (iron and manganese oxides); slightly acid.

The thickness of the solum is at least 47 inches. The clay content of the control section averages 27 to 33 percent.

The E horizon has value of 5 to 7 and chroma of 2 or 3. It ranges from strongly acid to neutral. The Bt horizon has value of 4 or 5 and chroma of 2 to 4. It ranges from slightly acid to very strongly acid. The 2Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6. Strata of silt loam to sandy loam are in some pedons.

Keomah Series

The Keomah series consists of somewhat poorly drained, moderately slowly permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 5 percent.

Keomah soils are similar to Clarksdale soils and are commonly adjacent to Clarksdale, Fayette, Rozetta, and Rushville soils. Clarksdale soils have a darker surface layer than Keomah soils and are on similar landscape positions. Fayette and Rozetta soils are better drained than Keomah soils and are steeper. Rushville soils are poorly drained and are in shallow depressions.

Typical pedon of Keomah silt loam, 0 to 2 percent slopes, 180 feet north and 2,185 feet west of the southeast corner of sec. 10, T. 2 S., R. 4 W.:

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

E—6 to 9 inches; brown (10YR 5/3) silt loam, light gray (10YR 7/2) dry; moderate medium platy structure; friable; many fine roots; few distinct light gray (10YR 7/1) silt coatings on faces of peds; few fine and medium dark concretions (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt1—9 to 13 inches; brown (10YR 5/3) silty clay loam; few fine faint grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; firm; many fine roots; common distinct light gray (10YR 7/1) silt coatings and common distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); very strongly acid; clear smooth boundary.

Bt2—13 to 20 inches; brown (10YR 5/3) silty clay; many fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky; very firm; common distinct light gray (10YR 7/1 dry) silt coatings on faces of peds in upper part and common distinct grayish brown (10YR 5/2) clay films on faces of peds throughout; common fine dark concretions (iron and manganese oxides); very strongly acid; clear smooth boundary.

Btg1—20 to 32 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; common fine roots; common distinct grayish brown (2.5Y 5/2) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg2—32 to 44 inches; light olive gray (5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm; few fine roots; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds; common medium dark concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg3—44 to 56 inches; light olive gray (5Y 6/2) silty clay loam; common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure; firm; few distinct grayish brown (2.5Y 5/2) clay films on faces of peds and in root channels; common medium dark concretions (iron and

manganese oxides); strongly acid; gradual wavy boundary.
Cg—56 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; many medium prominent yellowish brown (10YR 5/4) mottles; massive; friable; common fine dark concretions (iron and manganese oxides); medium acid.

The thickness of the solum is at least 52 inches. The clay content in the control section averages 35 to 40 percent.

The E horizon has chroma of 2 or 3. The Bt horizon has hue of 10YR to 5Y. In the upper part it has value of 4 or 5 and chroma of 3 or 4. It ranges from medium acid to very strongly acid. The Cg horizon has hue of 2.5Y or 5Y and ranges from medium acid to neutral.

Martinsville Series

The Martinsville series consists of well drained, moderately permeable soils on high stream terraces. These soils formed in loamy outwash. Slopes range from 2 to 10 percent.

Martinsville soils are similar to Hickory soils and are commonly adjacent to Fayette, Hickory, and Kendall soils. Fayette soils are fine-silty and are on uplands. Hickory soils formed in glacial till on uplands. Kendall soils are somewhat poorly drained and are less sloping than Martinsville soils.

Typical pedon of Martinsville loam, 2 to 5 percent slopes, 1,380 feet west and 460 feet north of the southeast corner of sec. 12, T. 1 N., R. 3 W.:

Ap—0 to 8 inches; dark brown (10YR 3/3) loam, pale brown (10YR 6/3) dry; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.
Bt1—8 to 16 inches; brown (10YR 4/3) loam; weak medium subangular blocky structure; friable; few fine roots; many distinct dark brown (10YR 3/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.
Bt2—16 to 23 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; many distinct dark brown (10YR 3/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); few pebbles; neutral; clear smooth boundary.
Bt3—23 to 30 inches; dark yellowish brown (10YR 4/4) clay loam; moderate medium subangular blocky structure; friable; few fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); few pebbles; neutral; clear smooth boundary.
Bt4—30 to 41 inches; dark yellowish brown (10YR 4/4) clay loam; weak medium subangular blocky structure; friable; few fine roots; common distinct brown (10YR 4/3) clay films and light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.
BC—41 to 60 inches; yellowish brown (10YR 5/4) silt loam; weak coarse subangular blocky structure; friable; few fine roots; few distinct brown (10YR 4/3) clay films and light gray (10YR 7/2 dry) silt coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid.

The thickness of the solum is at least 51 inches. The clay content of the control section averages 22 to 33 percent.

The A horizon is loam, silt loam, or sandy loam. It has value of 3 or 4 and chroma of 2 or 3. The Bt horizon has value of 4 to 6 and chroma of 3 to 6. Some areas have a C horizon, which is stratified silt loam, loam, sandy loam, and loamy sand.

Onarga Series

The Onarga series consists of well drained soils on low terraces along rivers. These soils are moderately permeable in the subsoil and rapidly permeable in the underlying material. They formed in medium textured and moderately coarse textured outwash. Slopes range from 0 to 2 percent.

These soils contain slightly less sand in the surface layer and slightly more clay in the control section than is defined as the range for the Onarga series. These differences, however, do not significantly affect the use or behavior of the soils.

Onarga soils are commonly adjacent to Beaucoup, Darwin, and Titus soils in the lower areas on bottom land. Beaucoup and Titus soils are poorly drained. Darwin soils are poorly drained and very poorly drained.

Typical pedon of Onarga loam, rarely flooded, 324 feet south and 312 feet east of the center of sec. 26, T. 2 S., R. 2 W.:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; neutral; abrupt smooth boundary.
A—7 to 13 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; few fine roots; neutral; clear smooth boundary.
AB—13 to 20 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.
Bt1—20 to 26 inches; brown (7.5YR 4/4) loam; moderate fine subangular blocky structure; friable;

few fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt2—26 to 32 inches; brown (7.5YR 4/4) loam; few fine distinct brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt3—32 to 40 inches; brown (7.5YR 4/4) loam; few fine distinct brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct very dark grayish brown (10YR 3/2) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

BC—40 to 52 inches; brown (7.5 YR 4/4) fine sandy loam; weak medium subangular blocky structure; very friable; few fine roots; medium acid; clear smooth boundary.

C—52 to 60 inches; brown (7.5YR 4/4) fine sandy loam; few fine distinct light yellowish brown (10YR 6/4) mottles and few fine prominent light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; very friable; few fine roots; medium acid.

The thickness of the mollic epipedon ranges from 15 to 20 inches. The A horizon has value of 2 or 3 and chroma of 1 or 2. It is fine sandy loam or loam. The Bt horizon has hue of 10YR or 7.5YR and chroma of 3 or 4. It is loam, fine sandy loam, or clay loam. It is medium acid or slightly acid.

Orion Series

The Orion series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in recent alluvium 20 to 40 inches deep over an older buried soil. Slopes range from 0 to 2 percent.

Orion soils are similar to Coffeen soils and are commonly adjacent to Beaucoup, Coffeen, and Titus soils. Coffeen soils have a mollic epipedon, and they and Orion soils are on similar landscape positions. Beaucoup and Titus soils are poorly drained and are at lower positions on the flood plains than Orion soils.

Typical pedon of Orion silt loam, 1,520 feet east and 1,500 feet north of the southwest corner of sec. 14, T. 2 S., R. 2 W.:

Ap—0 to 5 inches; brown (10YR 5/3) silt loam, very pale brown (10YR 7/3) dry; weak fine granular structure; friable; few very fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

C1—5 to 20 inches; brown (10YR 4/3 and 10YR 5/3) silt loam; common medium faint dark grayish brown (10YR 4/2) and light yellowish brown (10YR 6/4) mottles; moderate medium platy structure; friable; few very fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C2—20 to 25 inches; dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam; weak medium platy structure parting to moderate fine granular; friable; few very fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

Ab1—25 to 31 inches; very dark gray (10YR 3/1) silt loam; moderate fine granular structure; friable; few very fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Ab2—31 to 37 inches; very dark gray (10YR 3/1) silty clay loam; weak fine subangular blocky structure; friable; few very fine roots; few medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Ab3—37 to 52 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium subangular blocky structure; friable; few very fine roots; few medium dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bb—52 to 60 inches; dark gray (10YR 4/1) silty clay loam; few fine prominent light olive brown (2.5Y 5/4) mottles; moderate medium subangular blocky structure; friable; few very fine roots; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; few medium dark concretions (iron and manganese oxides); neutral.

The depth to the Ab horizon ranges from 20 to 40 inches. The clay content of the control section averages 10 to 18 percent.

The Ap horizon has value of 4 or 5 and chroma of 2 or 3. In some pedons the C horizon is stratified with thin layers of very fine sand. It is neutral or mildly alkaline.

Raddle Series

The Raddle series consists of well drained, moderately permeable soils on foot slopes. These soils formed in medium textured colluvium. Slopes range from 1 to 5 percent.

Raddle soils are commonly adjacent to Coffeen and Orion soils. Coffeen and Orion soils are somewhat poorly drained and are less sloping than Raddle soils.

Typical pedon of Raddle silt loam, 1 to 5 percent slopes, 126 feet north and 1,134 feet west of the center of sec. 14, T. 2 S., R. 2 W.:

Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate medium granular structure; friable; few fine roots; few small pebbles; neutral; clear smooth boundary.
AB—10 to 17 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 4/3) dry; moderate medium subangular blocky structure parting to moderate medium granular; friable; few fine roots; few small pebbles; neutral; clear smooth boundary.
Bw1—17 to 29 inches; brown (10YR 4/3) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark brown (10YR 3/3) organic coatings on faces of peds; few black (10YR 2/1) channel fillings; few small pebbles; neutral; clear smooth boundary.
Bw2—29 to 38 inches; brown (10YR4/3) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark brown (10YR 3/3) organic coatings on faces of peds; few very dark grayish brown (10YR 3/2) channel fillings; few small pebbles; neutral; clear smooth boundary.
Bw3—38 to 48 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark brown (10YR 3/3) organic coatings on faces of peds; neutral; clear smooth boundary.
BC—48 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few faint dark brown (10YR 3/3) organic coatings on faces of peds; neutral.

The thickness of the solum is at least 48 inches. The mollic epipedon ranges from 10 to 24 inches in thickness. The clay content of the control section averages 18 to 24 percent.

The A horizon has chroma of 1 to 3. The Bw horizon has value of 4 or 5. It is slightly acid or neutral.

Rozetta Series

The Rozetta series consists of moderately well drained, moderately permeable soils on loess-covered uplands. These soils formed in medium textured loess. Slopes range from 0 to 10 percent.

Rozetta soils are similar to Downs, Elco, Fayette, and Sylvan soils and are commonly adjacent to Downs, Fayette, Keomah, and Stronghurst soils. Downs, Fayette, and Sylvan soils are well drained, and they and Rozetta soils are on similar landscape positions. Elco soils formed in loess and in the underlying paleosol. Keomah and Stronghurst soils are somewhat poorly drained and are nearly level.

Typical pedon of Rozetta silt loam, 2 to 5 percent slopes, 950 feet west and 2,195 feet south of the northeast corner of sec. 35, T. 2 S., R. 3 W.:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to weak fine granular; friable; many roots; slightly acid; abrupt smooth boundary.
E—7 to 9 inches; brown (10YR 5/3) silt loam; weak fine and medium granular structure; friable; many roots; slightly acid; abrupt smooth boundary.
Bt1—9 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine and very fine subangular blocky structure; firm; many roots; few faint light gray (10YR 7/1) silt coatings and few faint dark brown (10YR 3/3) clay films on faces of peds in lower 4 inches; strongly acid; clear smooth boundary.
Bt2—15 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; firm; common roots; few faint light gray (10YR 7/1) silt coatings and many faint dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.
Bt3—22 to 26 inches; yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; common roots; few faint light gray (10YR 7/1) silt coatings and many faint dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.
Bt4—26 to 36 inches; yellowish brown (10YR 5/4) silty clay loam; few fine prominent light brownish gray (2.5Y 6/2) mottles; moderate medium and coarse subangular blocky structure; firm; few roots; few faint light gray (10YR 7/1) silt coatings and common faint dark brown (10YR 3/3) clay films on faces of peds; strongly acid; clear smooth boundary.
Bt5—36 to 49 inches; yellowish brown (10YR 5/4) silty clay loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; weak coarse angular blocky structure; firm; few faint dark brown (10YR 3/3) clay films on faces of peds; medium acid; gradual smooth boundary.
BC—49 to 60 inches; yellowish brown (10YR 5/4) silty clay loam; many medium prominent light brownish gray (2.5Y 6/2) mottles; weak coarse angular blocky structure; firm; few faint dark gray (10YR 3/3) and very dark brown (10YR 3/1) organic coatings on faces of peds; medium acid.

The thickness of the solum is at least 48 inches. The clay content of the control section averages 27 to 35 percent.

The Ap horizon has value of 3 to 5 and chroma of 2 or 3. It is silt loam or silty clay loam. The Bt horizon has value of 4 or 5 and chroma of 3 or 4. It is medium acid to very strongly acid. Some pedons have a C horizon. This horizon has value of 4 or 5 and chroma of 2 to 4. It ranges from medium acid to mildly alkaline.

Rushville Series

The Rushville series consists of poorly drained, slowly permeable soils in closed depressions on ridgetops. These soils formed in loess. Slopes range from 0 to 2 percent.

Rushville soils are similar to Denny soils and are commonly adjacent to Clarksdale, well drained Fayette and Keomah, and moderately well drained Rozetta soils. The Denny soils have a darker, thicker surface layer than the Rushville soils. The Clarksdale and Keomah soils are somewhat poorly drained and are at the slightly higher landscape positions. The Fayette and Rozetta soils are steeper than the Rushville soils.

Typical pedon of Rushville silt loam, 1,625 feet west and 2,000 feet south of the northeast corner of sec. 3, T. 2 S., R. 4 W.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to weak fine granular; friable; common roots; few fine and medium dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

E—8 to 13 inches; light gray (10YR 6/1) and light brownish gray (10YR 6/2) silt loam, light gray (10YR 7/1) dry; moderate medium platy structure; friable; common roots; common fine and medium dark concretions (iron and manganese oxides); strongly acid; abrupt smooth boundary.

Btg1—13 to 16 inches; grayish brown (2.5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/6) mottles; strong fine and medium angular and subangular blocky structure; firm; common roots; many distinct white (10YR 8/1 dry) silt coatings and common distinct gray (10YR 5/1) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); very strongly acid; abrupt smooth boundary.

Btg2—16 to 25 inches; grayish brown (2.5Y 5/2) silty clay; common fine prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to moderate medium angular blocky; very firm; common roots; many distinct gray (10YR 5/1) clay films and few distinct white (10YR 8/1 dry) silt coatings on faces of peds; common fine and medium dark concretions (iron and manganese oxides); very strongly acid; clear smooth boundary.

Btg3—25 to 35 inches; grayish brown (2.5Y 5/2) silty clay loam; common medium prominent yellowish brown (10YR 5/4 and 10YR 5/6) mottles; weak medium and coarse prismatic structure parting to moderate coarse angular blocky; firm; few roots; few distinct gray (10YR 5/1) and dark gray (10YR 4/1) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); strongly acid; gradual smooth boundary.

Btg4—35 to 46 inches; light gray (5Y 6/1) silty clay loam; common medium prominent light olive brown (2.5Y 5/4) mottles; weak coarse prismatic structure; firm; few roots; few distinct very dark gray (10YR 3/1) organic coatings as channel linings and gray (10YR 5/1) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); medium acid; gradual smooth boundary.

BCg—46 to 58 inches; light gray (5Y 6/1) silty clay loam; many medium prominent light olive brown (2.5Y 5/4) mottles; firm; few distinct very dark gray (10YR 3/1) organic coatings as channel linings; common fine and medium dark concretions (iron and manganese oxides); neutral; gradual wavy boundary.

Cg—58 to 60 inches; greenish gray (5GY 6/1) silt loam; few medium prominent light olive brown (2.5Y 5/4) mottles; massive; friable; few very dark gray (10YR 3/1) organic coatings as channel linings; neutral.

The thickness of the solum is at least 50 inches. The clay content of the control section averages 35 to 45 percent.

The E horizon has hue of 10YR or 2.5Y and value of 5 or 6. The Bt horizon has hue of 2.5Y or 5Y and value of 5 or 6. It is silty clay loam or silty clay. It ranges from slightly acid to very strongly acid. The C horizon has hue of 5GY or 5Y and chroma of 1 or 2. It is neutral or slightly acid.

Seaton Series

The Seaton series consists of well drained, moderately permeable soils on loess-covered uplands. These soils formed in loess. Slopes range from 15 to 50 percent.

Seaton soils are similar to and commonly adjacent to Fayette, Hamburg, and Sylvan soils. Fayette soils have a subsoil of silty clay loam and are less sloping than Seaton soils. Hamburg and Sylvan soils have a thinner solum than Seaton soils, and they and the Seaton soils are on similar landscape positions. Hamburg soils have a mollic epipedon.

Typical pedon of Seaton silt loam, 15 to 30 percent slopes, 2,060 feet west and 100 feet south of the northeast corner of sec. 15, T. 2 S., R. 2 W.:

A—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; few fine roots; slightly acid; clear smooth boundary.

E—4 to 7 inches; dark yellowish brown (10YR 4/4) silt loam; weak thin platy structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bt1—7 to 15 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; many distinct dark yellowish brown

(10YR 4/4) clay films on faces of peds; few fine roots; medium acid; clear smooth boundary.
Bt2—15 to 29 inches; dark yellowish brown (10YR 4/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; strongly acid; clear smooth boundary.
Bt3—29 to 43 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; slightly acid; clear smooth boundary.
BC—43 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium prismatic structure; friable; few fine roots; slightly acid.

The thickness of the solum is at least 43 inches. The clay content of the control section averages 18 to 27 percent.

The E horizon has chroma of 2 to 4. It is slightly acid or neutral. The Bt horizon has hue of 10YR or 7.5YR and value of 4 or 5.

Stronghurst Series

The Stronghurst series consists of somewhat poorly drained, moderately permeable soils on loess-covered uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Stronghurst soils are similar to Atterberry and Kendall soils and are commonly adjacent to Atterberry, Downs, Fayette, Rozetta, and Rushville soils. Atterberry soils have a darker surface layer than Stronghurst soils and are on similar landscape positions. Kendall soils have more sand in the lower part than Stronghurst soils. Well drained Downs and Fayette soils and moderately well drained Rozetta soils ar steeper than Stronghurst soils. Poorly drained Rushville soils are in shallow depressions that are subject to ponding.

Typical pedon of Stronghurst silt loam, 2,200 feet south and 740 feet east of the northwest corner of sec. 1, T. 2 S., R. 3 W.:

Ap—0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; moderate medium granular structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.
E—9 to 14 inches; grayish brown (10YR 5/2) silt loam; weak medium platy structure; friable; common fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.
Bt1—14 to 18 inches; yellowish brown (10YR 5/4) silty clay loam; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine subangular blocky structure; friable; common fine roots; many distinct grayish brown (10YR 5/2) clay films and common faint light gray (10YR 7/2 dry) silt coatings on faces of peds; few medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
Bt2—18 to 28 inches; yellowish brown (10YR 5/4) silty clay loam; common fine faint yellowish brown (10YR 5/6) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
Bt3—28 to 40 inches; brown (10YR 5/3) silty clay loam; common fine distinct yellowish brown (10YR 5/6) and light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.
BCg—40 to 53 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; dark gray (10YR 4/1) channel fillings; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.
Cg—53 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral.

The thickness of the solum ranges from 42 to 60 inches. The clay content of the control section averages 30 to 34 percent.

The E horizon has value of 5 or 6 and chroma of 2 or 3. It ranges from medium acid to neutral. The Bt horizon has value of 4 to 6. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. In some pedons free carbonates are at a depth of more than 60 inches.

Sylvan Series

The Sylvan series consists of well drained, moderately permeable soils on side slopes of dissected uplands. These soils formed in loess. Slopes range from 5 to 30 percent.

Sylvan soils are similar to Fayette, Rozetta, and Seaton soils and commonly are adjacent to Fayette, Rozetta, Seaton, and Stronghurst soils. Fayette, Rozetta, and Seaton soils do not have calcareous material within 40 inches of the surface. They are in landscape positions similar to those of Sylvan soils. Stronghurst

soils are somewhat poorly drained and are less sloping than Sylvan soils.

Typical pedon of Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded, 2,360 feet south and 1,050 feet west of the northeast corner of sec. 34, T. 1 S., R. 2 W.:

Ap—0 to 7 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silty clay loam, light yellowish brown (2.5Y 6/4) dry; moderate very fine subangular blocky structure; friable; few fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 13 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt2—13 to 19 inches; yellowish brown (10YR 5/4) silt loam; moderate medium subangular blocky structure; friable; few fine roots; many distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BC—19 to 27 inches; yellowish brown (10YR 5/4) silt loam; common medium prominent light brownish gray (2.5Y 6/2) mottles and common medium faint yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common distinct brown (10YR 4/3) clay films on faces of peds; few fine dark concretions (iron and manganese oxides); mildly alkaline; clear smooth boundary.

C—27 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common medium prominent yellowish brown (10YR 5/4 and 10YR 5/8) mottles; massive; friable; few fine roots; few fine dark concretions (iron and manganese oxides); slight effervescence; moderately alkaline.

The thickness of the solum and the depth to free carbonates range from 22 to 40 inches. The clay content of the control section averages 25 to 35 percent.

The Ap horizon has value of 4 or 5 and chroma of 2 to 4. It is silt loam or silty clay loam. The Bt horizon has value of 4 or 5. It is slightly acid or neutral. The C horizon has hue of 10YR or 2.5Y.

Tice Series

The Tice series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in medium textured alluvium. Slopes range from 0 to 2 percent.

Tice soils are similar to Beaucoup soils and commonly are adjacent to Beaucoup, Haymond, and Wakeland soils. Beaucoup soils are poorly drained and are on lower positions on the flood plains than Tice soils. Haymond soils are well drained and are on higher positions than Tice soils. Wakeland soils do not have a mollic epipedon, and they and Tice soils are on similar positions.

Typical pedon of Tice silt loam, 1,940 feet east and 800 feet south of the northwest corner of sec. 18, T. 1 N., R. 2 W.:

Ap—0 to 12 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; friable; few fine roots; common faint very dark gray (10YR 3/1) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

Bw1—12 to 18 inches; brown (10YR 4/3) silt loam; few fine faint grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bw2—18 to 24 inches; brown (10YR 4/3) silt loam; common fine distinct light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; few distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

Bg—24 to 36 inches; light brownish gray (2.5Y 6/2) silt loam; many fine prominent dark yellowish brown (10YR 4/4) mottles and few fine prominent yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

BCg—36 to 49 inches; light brownish gray (2.5Y 6/2) silt loam; many fine prominent dark yellowish brown (10YR 4/4) mottles and few fine prominent yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Cg—49 to 60 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles; massive; friable; few fine roots; few fine dark concretions (iron and manganese oxides); medium acid.

The thickness of the solum ranges from 40 to 60 inches. The thickness of the mollic epipedon ranges from 12 to 24 inches. The clay content of the control section averages 22 to 27 percent.

The A horizon has value and chroma of 2 or 3. The B and Cg horizons range from neutral to medium acid. The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 6, and chroma of 1 or 2.

Titus Series

The Titus series consists of poorly drained, slowly permeable soils on flood plains along the major rivers. These soils formed in moderately fine textured or fine textured slack-water sediments. Slopes range from 0 to 2 percent.

Titus soils are similar to Beaucoup and Darwin soils and are commonly adjacent to Beaucoup, Darwin, and Orion soils. Beaucoup soils are fine-silty and are at slightly higher landscape positions than Titus soils. Darwin soils generally are more than 45 percent clay in the control section and are in slightly lower positions than Titus soils. Orion soils are coarse-silty and are at higher positions than Titus soils.

Typical pedon of Titus silty clay loam, 1,100 feet south and 1,280 feet east of the northwest corner of sec. 34, T. 2 S., R. 2 W.:

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine granular structure; firm; few fine dark concretions (iron and manganese oxides); few fine roots; slightly acid; abrupt smooth boundary.

AB—8 to 18 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few fine prominent yellowish brown (10YR 5/6) mottles; moderate fine angular blocky structure; firm; common fine dark concretions (iron and manganese oxides); few fine roots; neutral; clear smooth boundary.

Bg1—18 to 26 inches; olive gray (5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate fine angular blocky; firm; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine dark concretions (iron and manganese oxides); few fine roots; neutral; clear smooth boundary.

Bg2—26 to 32 inches; olive gray (5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium angular blocky; firm; many distinct very dark gray (10YR 3/1) organic coatings on faces of peds; common fine dark concretions (iron and manganese oxides); few fine roots; few pebbles; neutral; clear smooth boundary.

Bg3—32 to 45 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles and few fine prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; friable; few faint dark gray (10YR 4/1) pressure faces on peds; common fine dark concretions (iron and manganese oxides); few fine roots; neutral; clear smooth boundary.

Bg4—45 to 51 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles and common fine prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few faint dark gray (10YR 4/1) pressure faces on peds; common faint dark concretions (iron and manganese oxides); few fine roots; neutral; clear smooth boundary.

Bg5—51 to 60 inches; grayish brown (2.5Y 5/2) silty clay loam; many fine prominent yellowish brown (10YR 5/6) mottles and common fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine dark concretions (iron and manganese oxides); few fine roots; mildly alkaline.

The thickness of the solum is at least 48 inches. The thickness of the mollic epipedon ranges from 12 to 24 inches. The clay content of the control section is 35 to 45 percent.

The A horizon has value of 2 or 3. It is silty clay or silty clay loam. The Bg horizon has hue of 10YR to 5Y, value of 4 or 5, and chroma of 1 or 2. It is silty clay or silty clay loam. It is slightly acid to mildly alkaline.

Ursa Series

The Ursa series consists of well drained, slowly permeable soils on till plains. These soils formed in moderately fine textured paleosols and up to 20 inches of overlying loess or pedisediment. Slopes range from 10 to 15 percent.

Ursa soils are commonly adjacent to Atlas, Elco, Fishhook, Hickory, and Rozetta soils. Atlas and Fishhook soils occupy similar landscape positions and have lower chroma in the upper part of the argillic horizon than Ursa soils. Elco soils have less clay in the control section than Ursa soils, and they and Ursa soils are on similar positions. Hickory and Rozetta soils have moderate permeability. Hickory soils are steeper than Ursa soils, and Rozetta soils are less sloping.

Typical pedon of Ursa loam, 10 to 15 percent slopes, eroded, 1,000 feet east and 740 feet north of the southwest corner of sec. 6, T. 1 N., R. 4 W.:

A—0 to 7 inches; mixed dark grayish brown (10YR 4/2) and yellowish brown (10YR 5/4) loam, light brownish gray (10YR 6/2) dry; moderate medium granular structure; friable; common fine roots; few small pebbles; medium acid; abrupt smooth boundary.

Bt1—7 to 14 inches; yellowish brown (10YR 5/4) loam; weak fine subangular blocky structure; friable; few fine roots; few distinct dark yellowish brown (10YR

4/4) clay films on faces of peds; few fine concretions (iron and manganese oxides); few small pebbles; strongly acid; clear smooth boundary.

Bt2—14 to 21 inches; yellowish brown (10YR 5/6) clay loam; moderate fine subangular blocky structure; firm; few fine roots; common distinct dark yellowish brown (10YR 4/4) clay films on faces of peds; few fine concretions (iron and manganese oxides); common small pebbles; strongly acid; clear smooth boundary.

Bt3—21 to 31 inches; yellowish brown (10YR 5/6) clay loam; strong medium subangular blocky structure; firm; few fine roots; many distinct brown (7.5YR 4/4) clay films on faces of peds; few fine concretions (iron and manganese oxides); common small pebbles; strongly acid; clear smooth boundary.

Bt4—31 to 46 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct grayish brown (10YR 5/2) mottles; strong medium subangular blocky structure; firm; few fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds; few fine concretions (iron and manganese oxides); common small pebbles; medium acid; clear smooth boundary.

Bt5—46 to 52 inches; yellowish brown (10YR 5/6) clay loam; few fine distinct grayish brown (10YR 5/2) and brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few distinct brown (7.5YR 4/4) clay films on faces of peds; few fine concretions (iron and manganese oxides); common small pebbles; neutral; clear smooth boundary.

BC—52 to 60 inches; yellowish brown (10YR 5/6) clay loam; common medium prominent light brownish gray (2.5Y 6/2) mottles; weak coarse subangular blocky structure; firm; few fine roots; few fine concretions (iron and manganese oxides); common small pebbles; neutral.

The control section averages 35 to 45 percent clay and 15 to 35 percent sand. The A horizon has value of 3 or 4. It is loam or silt loam. Some pedons have an E horizon. This horizon is brown (10YR 5/3) loam. It is strongly acid or medium acid. The Bt horizon has chroma of 2 to 6.

Virden Series

The Virden series consists of poorly drained, moderately slowly permeable soils in low areas and closed depressions on loess-covered uplands. These soils formed in loess. Slopes range from 0 to 2 percent.

Virden soils are similar to Herrick and Ipava soils and are commonly adjacent to Denny, Herrick, and Ipava soils. Denny soils have an albic horizon and are in shallow depressions. Herrick and Ipava soils are somewhat poorly drained and are on higher landscape positions than Virden soils.

Typical pedon of Virden silty clay loam, 1,448 feet west and 144 feet south of the northeast corner of sec. 1, T. 1 S., R. 4 W.:

Ap—0 to 8 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; weak fine granular structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

BA—8 to 14 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; moderate fine subangular blocky structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Bt—14 to 18 inches; very dark gray (10YR 3/1) silty clay loam, dark gray (10YR 4/1) dry; few fine distinct yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; firm; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Btg1—18 to 22 inches; olive gray (5Y 5/2) silty clay loam; few fine prominent yellowish brown (10YR 5/4) mottles; moderate fine subangular blocky structure; firm; few fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Btg2—22 to 30 inches; olive gray (5Y 5/2) silty clay loam; common fine prominent strong brown (7.5YR 5/8) and yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine roots; many distinct very dark gray (10YR 3/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Btg3—30 to 41 inches; gray (5Y 5/1) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles and many fine prominent yellowish brown (10YR 5/4) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; friable; few fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

Btg4—41 to 48 inches; gray (5Y 5/1) silty clay loam; common fine prominent strong brown (7.5YR 5/8) mottles and many fine prominent yellowish brown (10YR 5/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; common distinct dark gray (10YR 4/1) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

BCg—48 to 60 inches; gray (5Y 5/1) silt loam; common medium prominent brownish yellow (10YR 6/6) mottles and common fine prominent strong brown

(7.5YR 5/8) mottles; weak medium prismatic structure; friable; few fine roots; common distinct dark gray (10YR 4/1) clay films on vertical faces of peds; common fine dark concretions (iron and manganese oxides); neutral.

The thickness of the solum is at least 55 inches. The thickness of the mollic epipedon ranges from 18 to 20 inches.

The A horizon is silt loam or silty clay loam. It is black (10YR 2/1) or very dark gray (10YR 3/1). The Btg horizon has hue of 10YR, 2.5Y, or 5Y and value of 4 or 5. It ranges from medium acid to neutral.

Wagner Series

The Wagner series consists of poorly drained, very slowly permeable soils on low terraces along rivers. These soils formed in moderately fine textured alluvium. Slopes range from 0 to 2 percent.

These soils have higher chroma in the upper part of the subsoil and are less acid in the lower part of the solum than is defined as the range for the Wagner series. Also, they do not have the abrupt textural change between the E and the Bt horizons that is definitive for the series. These differences do not alter the use or management of the soils.

Wagner soils are commonly adjacent to Beaucoup, Darwin, Onarga, and Titus soils. Beaucoup, Darwin, and Titus soils are on flood plains. Onarga soils are well drained and are at higher positions on the terraces than Wagner soils.

Typical pedon of Wagner silt loam, 150 feet north and 1,488 feet west of the southeast corner of sec. 20, T. 1 S., R. 1 W.:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; friable; few fine roots; few small dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

AE—8 to 12 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; common fine distinct yellowish brown (10YR 5/4) mottles; weak fine granular structure; friable; few fine roots; many distinct very dark grayish brown (10YR 3/2) organic coatings on faces of peds; few fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

E—12 to 16 inches; grayish brown (10YR 5/2) silt loam; common medium prominent strong brown (7.5YR 4/6) mottles and many medium faint dark grayish brown (10YR 4/2) mottles; moderate thin platy structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); slightly acid; abrupt smooth boundary.

Bt1—16 to 27 inches; brown (10YR 5/3) silty clay loam; many medium faint dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky structure; friable; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; common fine and medium dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

Bt2—27 to 40 inches; yellowish brown (10YR 5/4) silty clay loam; many medium faint dark yellowish brown (10YR 4/4) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; few fine roots; many distinct grayish brown (10YR 5/2) clay films on faces of peds; few fine and medium dark concretions (iron and manganese oxides); few small pebbles 2 to 5 millimeters in size; slightly acid; clear smooth boundary.

Bt3—40 to 50 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; many prominent grayish brown (2.5Y 5/2) clay films on faces of peds; few fine and medium dark concretions (iron and manganese oxides); few small pebbles 2 to 5 millimeters in size; neutral; clear smooth boundary.

BC—50 to 60 inches; grayish brown (10YR 5/2) silty clay loam; many medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common distinct grayish brown (2.5Y 5/2) clay films lining channels; few fine and medium dark concretions (iron and manganese oxides); few small pebbles 2 to 5 millimeters in size; neutral.

The thickness of the solum is at least 50 inches. The clay content of the control section averages 25 to 35 percent.

The Ap horizon has chroma of 1 or 2. The E horizon has value of 4 to 6. It ranges from strongly acid to neutral. The Bt horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 to 4. It ranges from medium acid to neutral.

Wakeland Series

The Wakeland series consists of somewhat poorly drained, moderately permeable soils on flood plains. These soils formed in medium textured alluvium. Slopes range from 0 to 2 percent.

Wakeland soils are commonly adjacent to Beaucoup, Coffeen, and Orion soils. Wakeland soils and Coffeen and Orion soils are on similar landscape positions. Coffeen soils have a mollic epipedon, and Orion soils have a dark buried soil at a depth of 20 to 40 inches. Beaucoup soils are poorly drained and are on lower positions on the flood plains than Wakeland soils.

Typical pedon of Wakeland silt loam, 170 feet east and 880 feet north of the southwest corner of sec. 22, T. 1 N., R. 4 W.:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam, light gray (10YR 7/2) dry; few fine faint brown (10YR 5/3) mottles; weak medium granular structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

C1—8 to 16 inches; dark grayish brown (10YR 4/2) silt loam; few fine faint brown (10YR 5/3) mottles; massive with thin bedding planes evident; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C2—16 to 31 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint brown (10YR 5/3) mottles and common fine prominent strong brown (7.5YR 4/6) mottles; massive with thin bedding planes evident; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C3—31 to 42 inches; dark grayish brown (10YR 4/2) silt loam; common fine prominent strong brown (7.5YR 4/6) mottles and common fine faint brown (10YR 5/3) mottles; massive with thin bedding planes evident; friable; common distinct brown (7.5YR 4/2) stains; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C4—42 to 60 inches; grayish brown (10YR 5/2) stratified silt loam, fine sandy loam, and gravelly loam; common fine prominent strong brown (7.5YR 4/6) mottles; massive with thin bedding planes evident; friable; common fine dark concretions (iron and manganese oxides); neutral.

The clay content of the control section is 10 to 17 percent. The A horizon has value of 4 or 5 and chroma of 1 or 2. The upper part of the C horizon has value of 4 or 5 and chroma of 2 or 3. The lower part has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3. In some areas it is stratified silt loam, loam, and fine sandy loam. Reaction in the C horizon ranges from medium acid to neutral.

Wilbur Series

The Wilbur series consists of moderately well drained, moderately permeable soils on flood plains. These soils formed in silty alluvium. Slopes range from 0 to 2 percent.

Wilbur soils are commonly adjacent to Orion, Raddle, and Titus soils. Orion soils are somewhat poorly drained and have a dark buried soil at a depth of 20 and 40 inches. Raddle soils are well drained and are more sloping than Wilbur soils. Titus soils are poorly drained and are at lower positions than Wilbur soils.

Typical pedon of Wilbur silt loam, 1,700 feet east and 2,180 feet south of the northwest corner of sec. 6, T. 2 S., R. 1 W.:

Ap—0 to 9 inches; brown (10YR 4/3 and 10YR 5/3) silt loam, light brownish gray (10YR 6/2) dry; weak medium granular structure; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

C1—9 to 27 inches; brown (10YR 4/3) silt loam; many medium faint brown (10YR 5/3) mottles and common medium faint grayish brown (10YR 5/2) mottles; massive with thin bedding planes evident; friable; few fine roots; few fine distinct brown stains (7.5YR 4/4); few fine dark concretions (iron and manganese oxides); neutral; gradual smooth boundary.

C2—27 to 41 inches; dark grayish brown (10YR 4/2) silt loam; many medium faint brown (10YR 5/4) mottles and common medium distinct yellowish brown (10YR 5/3) mottles; massive with thin bedding planes evident; friable; few fine roots; few fine distinct brown (7.5YR 4/4) stains; few fine dark concretions (iron and manganese oxides); neutral; clear smooth boundary.

C3—41 to 60 inches; dark grayish brown (10YR 4/2) silt loam; few medium faint brown (10YR 5/3) mottles and few fine prominent dark reddish brown (5YR 3/3) mottles; massive with thin bedding planes evident; friable; few fine roots; few fine dark concretions (iron and manganese oxides); neutral.

The clay content of the control section ranges from 10 to 17 percent. The A horizon has chroma of 2 or 3. The C horizon has value of 4 or 5 and chroma of 2 to 4. It is mainly silt loam, but in some pedons it has thin strata of loam and fine sandy loam.

Formation of the Soils

Leon R. Follmer, Ph.D., associate geologist, Illinois State Geological Survey, helped prepare this section.

The soils of Brown County exhibit a wide range of properties. These differences can be attributed to differences in factors of soil formation (*7*). The characteristics of the soil at any given time and place are determined by (1) the physical and mineralogical composition of the parent material, (2) the climate under which the soil formed and has existed since the parent material has been exposed at the land surface, (3) the plant and animal life on and in the soil, (4) the relief, or lay of the land, and (5) the length of time that the processes of soil formation have acted on the parent material.

Parent Material

The parent material is the unconsolidated mass in which the soils have formed. It affects the mineralogical and chemical composition of the soil and, to a large extent, the rate at which soil-forming processes take place.

The soils of Brown County have formed in a variety of parent materials: loess, alluvium, glacial drift, lacustrine sediments, and material weathered from bedrock. Figure

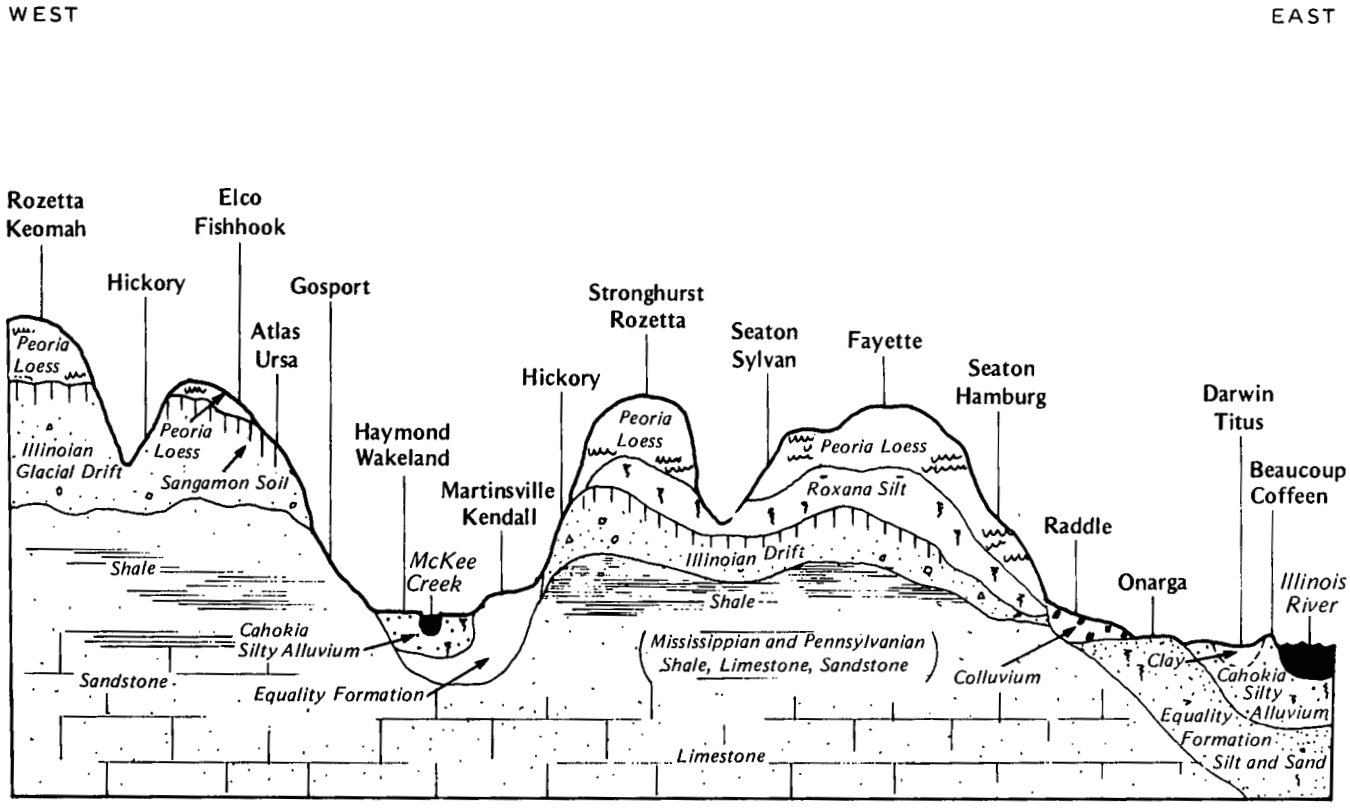


Figure 12.—Typical cross section showing the relationship of parent material to soils in Brown County.

12 shows a generalized relationship of some of the major soils and parent materials.

Loess, a wind-deposited silty material, is the most extensive parent material. It is the youngest deposit on the uplands, and it blankets most of the other parent materials. The loess in Brown County has been deposited in increments and can be subdivided on the basis of age, color, texture, and composition. The upper part is known as Peoria Loess, and the lower part is known as Roxana Silt. Where the loess is thin, the soil has formed in and through the loess into the underlying deposits. The loess is about 20 to 30 feet thick near the valley of the Illinois River and is thinner toward the west (*12*). Seaton and Fayette are the dominant soils that formed on the loess-covered bluffs in the eastern part of the county. On moderately steep and steep slopes in this part of the county, the loess is thin or has been removed by erosion. In these locations, the slopes are dominated by Hickory soils, which formed dominantly in Illinoian glacial till commonly covered by a thin layer of silty material.

In the sloping areas in the western part of the county, Illinoian glacial till and material weathered from Mississipian- and Pennsylvanian-age bedrock are dominant parent materials. Generally confined to the sides and heads of drainageways are soils that developed in less than 40 inches of loess over a Sangamon soil developed in glacial deposits (fig. 12). The major soils in these positions are Fishhook, Atlas, Elco, Ursa, and Keller soils. The moderately steep and steep side slopes along drainageways are dominated by soils that formed in a thin layer of silty colluvium and in the underlying clayey material weathered from Pennsylvanian-age shale. Gosport soils are common on these slopes. In many places the shale on these steeper slopes is covered with a thin remnant of Illinoian glacial till in which Hickory soils formed.

In the valleys of Brown County, water-laid deposits of Cahokia Alluvium and the Equality Formation form the bottom lands and terraces. The flood plains along the smaller creeks in the county are generally underlain by silty alluvium. Haymond and Wakeland soils are dominant in these areas. On the flood plain along the Illinois River, the alluvium is dominantly silty and the Wilbur, Wakeland, Coffeen, and Beaucoup soils are dominant. Many old river-bottom lakes that are drained are occupied by fine textured alluvial materials. Titus and Darwin soils are dominant in these areas. A few terraces along McKee Creek and the Illinois and La Moine Rivers formed in silty to sandy deposits of the Equality Formation and are overlain by silty loessal or colluvial material. The colluvium has accumulated as a result of gravitational action and is the parent material of the Raddle soils.

Climate

The degree of weathering, which is largely controlled by rainfall and temperature, affects soil horizonation and vegetation. The humid, temperate climate of Brown County favors vigorous plant growth. The climate also weathers parent material, reducing the size of soil particles. As a result, small clay particles are formed and moved downward in the soil profile. The rainfall has leached some of the basic elements from the soil, leaving soil horizons with varying levels of acidity.

Plants and Animals

All living organisms in or on the soil influence the soil to some degree. Vegetation generally has a greater effect than other life forms. The vegetation in Brown County prior to the time of settlement caused many soil differences we notice today. Soils with a dark surface layer formed under native prairie grasses and contain large amounts of organic matter. Soils with a light colored surface layer formed under forests dominated by oak and hickory and contain little organic matter. Some soils formed under mixed forest and grass or were forested for a short time before being cleared. These soils have a moderately dark surface layer and intermediate organic matter content.

Small burrowing animals, insects, grubs, earthworms, and other such animals mix the soil to varying degrees. Bacteria and fungi aid in the decomposition of plant and animal remains.

The activities of man have also affected soil formation. Clearing forests, draining, irrigating, excavating, and fertilizing are activities that influence soil formation.

Relief

Some differences in the soil are the result of relief or topography. Soil drainage, runoff, and the degree of erosion or deposition are all affected by the relief of an area. As slope increases, the rate of runoff and the hazard of erosion increase and the rate of soil development decreases. A water table in a sloping soil generally is at a greater depth than one in a nearly level or depressional soil, even though both soils formed in similar parent material.

Time

The evaluation of time as a factor in soil formation is difficult because of the combined effects of the other soil-forming factors. Generally, the longer the soil is subject to a soil-forming factor, the more strongly developed it is. However, an apparently young, slightly weathered soil and an apparently old, strongly

weathered soil may develop in the same period of time if other factors of soil formation are quite different.

Soils develop more rapidly in materials containing low amounts of carbonates than in materials with greater amounts.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from

seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, any plowed or disturbed surface layer.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is in part a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) granular, prismatic, or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8

Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the

underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from about 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons. It includes all subdivisions of these horizons.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-80 at Griggsville, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	34.3	16.4	25.4	39	12	0	1.58	0.73	1.97	4	5.2
February---	40.0	21.4	30.7	44	15	0	1.39	.66	1.68	4	4.7
March------	50.7	30.2	40.5	56	26	0	3.09	1.73	4.04	7	5.9
April------	65.5	43.0	54.3	68	39	180	4.04	2.64	6.19	8	.2
May--------	75.3	53.0	64.2	79	49	440	4.24	2.09	6.30	7	T**
June-------	83.9	61.8	72.9	88	59	687	4.03	1.92	5.88	7	.0
July-------	87.9	65.6	76.8	91	63	831	4.30	2.34	6.48	6	.0
August-----	85.9	63.4	74.7	88	61	766	3.52	1.71	5.38	4	.0
September--	79.4	55.8	67.6	83	53	528	3.50	2.18	5.23	5	.0
October----	68.1	45.2	56.7	72	42	225	2.94	1.19	4.45	4	T**
November---	52.4	33.3	42.9	55	30	10	2.13	.81	3.43	4	1.3
December---	39.8	22.9	31.4	44	19	0	1.97	.25	2.93	4	6.8
Yearly:											
Average--	63.6	42.7	53.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	4	---	---	---	---	---	---
Total----	---	---	---	---	---	3,667	36.37	18.25	53.96	64	24.1

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (55 degrees F).

** Trace.

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1960-80 at Griggsville, Illinois)

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 9	Mar. 25	Apr. 5
2 years in 10 later than--	Mar. 17	Mar. 31	Apr. 9
*5 years in 10 later than--	Mar. 25	Apr. 5	Apr. 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 20	Oct. 13	Oct. 8
2 years in 10 earlier than--	Nov. 4	Oct. 17	Oct. 14
*5 years in 10 earlier than--	Nov. 8	Oct. 30	Oct. 22

* Period of data record is 1931-60.

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-80 at Griggsville, Illinois)

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	204	190	168
8 years in 10	213	193	173
5 years in 10	228	205	188
2 years in 10	243	218	201
1 year in 10	254	225	211

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
6C2	Fishhook silt loam, 5 to 10 percent slopes, eroded	2,257	1.1
6C3	Fishhook silty clay loam, 5 to 10 percent slopes, severely eroded	1,422	0.7
7D2	Atlas silt loam, 10 to 15 percent slopes, eroded	1,703	0.9
7D3	Atlas clay loam, 10 to 15 percent slopes, severely eroded	799	0.4
8F	Hickory loam, 15 to 30 percent slopes	20,162	10.3
8G	Hickory loam, 30 to 50 percent slopes	7,256	3.7
16	Rushville silt loam	845	0.4
17A	Keomah silt loam, 0 to 2 percent slopes	8,712	4.4
17B	Keomah silt loam, 2 to 5 percent slopes	9,071	4.6
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded	1,882	1.0
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded	2,454	1.2
19F3	Sylvan silt loam, 15 to 30 percent slopes, severely eroded	729	0.4
26	Wagner silt loam	283	0.1
30G	Hamburg silt, 25 to 50 percent slopes	218	0.1
43A	Ipava silt loam, 0 to 2 percent slopes	5,944	3.0
43B	Ipava silt loam, 2 to 5 percent slopes	1,537	0.8
45	Denny silt loam	358	0.2
46	Herrick silt loam	2,401	1.2
50	Virden silty clay loam	8,475	4.3
61	Atterberry silt loam	445	0.2
70	Beaucoup silty clay loam	1,036	0.5
71	Darwin silty clay	1,466	0.7
119D	Elco silt loam, 10 to 15 percent slopes	2,801	1.4
119D3	Elco silty clay loam, 10 to 15 percent slopes, severely eroded	1,098	0.6
150	Onarga loam, rarely flooded	467	0.2
242A	Kendall silt loam, 0 to 3 percent slopes	816	0.4
257A	Clarksdale silt loam, 0 to 2 percent slopes	3,003	1.5
257B	Clarksdale silt loam, 2 to 5 percent slopes	2,206	1.1
264F	El Dara fine sandy loam, 15 to 30 percent slopes	547	0.3
264G	El Dara fine sandy loam, 30 to 50 percent slopes	683	0.3
274F	Seaton silt loam, 15 to 30 percent slopes	4,301	2.2
274G	Seaton silt loam, 30 to 50 percent slopes	1,971	1.0
278	Stronghurst silt loam	1,342	0.7
279A	Rozetta silt loam, 0 to 2 percent slopes	952	0.5
279B	Rozetta silt loam, 2 to 5 percent slopes	12,367	6.4
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded	10,240	5.2
279C3	Rozetta silty clay loam, 5 to 10 percent slopes, severely eroded	3,577	1.8
280B	Fayette silt loam, 2 to 5 percent slopes	5,120	2.6
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded	7,169	3.6
280C3	Fayette silty clay loam, 5 to 10 percent slopes, severely eroded	1,853	0.9
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded	3,649	1.9
280D3	Fayette silty clay loam, 10 to 15 percent slopes, severely eroded	3,506	1.8
284	Tice silt loam	1,202	0.6
331A	Haymond silt loam, 0 to 3 percent slopes	8,047	4.1
333	Wakeland silt loam	6,292	3.2
336	Wilbur silt loam	558	0.3
386B	Downs silt loam, 2 to 5 percent slopes	866	0.4
404	Titus silty clay loam	1,160	0.6
415	Orion silt loam	1,031	0.5
428	Coffeen silt loam	1,200	0.6
430B	Raddle silt loam, 1 to 5 percent slopes	1,085	0.6
470C	Keller silt loam, 5 to 10 percent slopes	660	0.3
551F	Gosport silty clay loam, 15 to 30 percent slopes	2,727	1.4
551G	Gosport silty clay loam, 30 to 50 percent slopes	7,588	3.8
570B	Martinsville loam, 2 to 5 percent slopes	323	0.2
570C2	Martinsville loam, 5 to 10 percent slopes, eroded	310	0.2
605D2	Ursa loam, 10 to 15 percent slopes, eroded	2,512	1.3
800B	Psamments, gently sloping	181	0.1
806F	Orthents, clayey-skeletal, hilly	95	*
864	Pits, quarries	73	*
865	Pits, gravel	29	*
937F	Seaton-Hickory complex, 15 to 30 percent slopes	5,225	2.7
937G	Seaton-Hickory silt loams, 30 to 50 percent slopes	1,636	0.8

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
967F	Hickory-Gosport complex, 15 to 30 percent slopes	3,889	2.0
1404	Titus silty clay loam, wet	599	0.3
3070	Beaucoup silty clay loam, frequently flooded	707	0.4
4071	Darwin silty clay, ponded	589	0.3
	Water	1,413	0.7
	Total	197,120	100.0

* Less than 0.1 percent.

TABLE 5.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
17A	Keomah silt loam, 0 to 2 percent slopes (where drained)
17B	Keomah silt loam, 2 to 5 percent slopes (where drained)
26	Wagner silt loam (where drained)
43A	Ipava silt loam, 0 to 2 percent slopes
43B	Ipava silt loam, 2 to 5 percent slopes
45	Denny silt loam (where drained)
46	Herrick silt loam
50	Virden silty clay loam (where drained)
61	Atterberry silt loam (where drained)
70	Beaucoup silty clay loam (where drained)
71	Darwin silty clay (where drained)
150	Onarga loam, rarely flooded
242A	Kendall silt loam, 0 to 3 percent slopes (where drained)
257A	Clarksdale silt loam, 0 to 2 percent slopes (where drained)
257B	Clarksdale silt loam, 2 to 5 percent slopes (where drained)
278	Stronghurst silt loam (where drained)
279A	Rozetta silt loam, 0 to 2 percent slopes
279B	Rozetta silt loam, 2 to 5 percent slopes
280B	Fayette silt loam, 2 to 5 percent slopes
284	Tice silt loam (where protected from flooding or not frequently flooded during the growing season)
331A	Haymond silt loam, 0 to 3 percent slopes (where protected from flooding or not frequently flooded during the growing season)
333	Wakeland silt loam (where drained and either protected from flooding or not frequently flooded during the growing season)
336	Wilbur silt loam
386B	Downs silt loam, 2 to 5 percent slopes
404	Titus silty clay loam (where drained)
415	Orion silt loam
428	Coffeen silt loam
430B	Raddle silt loam, 1 to 5 percent slopes
570B	Martinsville loam, 2 to 5 percent slopes

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Alfalfa-orchardgrass hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
6C2---------- Fishhook	IIIe	69	20	22	42	2.4	3.9
6C3---------- Fishhook	IVe	58	17	18	35	2.0	3.3
7D2---------- Atlas	IVe	49	15	18	41	2.1	3.4
7D3---------- Atlas	VIe	---	---	15	34	1.7	2.8
8F---------- Hickory	VIe	---	---	---	---	2.4	4.0
8G---------- Hickory	VIIe	---	---	---	---	---	3.0
16---------- Rushville	IIIw	114	36	47	64	---	---
17A---------- Keomah	IIw	129	39	52	72	5.1	8.5
17B---------- Keomah	IIe	128	39	51	71	5.0	7.4
19C3---------- Sylvan	IVe	95	30	46	57	4.4	7.2
19D3---------- Sylvan	IVe	93	29	44	55	4.2	6.9
19F3---------- Sylvan	VIe	---	---	---	---	3.4	5.7
26---------- Wagner	IIIw	100	33	45	60	---	6.5
30G---------- Hamburg	VIIe	---	---	---	---	---	---
43A---------- Ipava	I	163	52	66	91	6.1	10.2
43B---------- Ipava	IIe	161	51	65	90	6.0	10.1
45---------- Denny	IIw	113	37	47	62	---	---
46---------- Herrick	IIw	141	45	61	78	5.5	9.2
50---------- Virden	IIw	138	46	57	72	---	---

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Alfalfa-orchardgrass hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
61---------- Atterberry	I	149	44	60	85	5.6	9.0
70---------- Beaucoup	IIw	138	46	55	75	---	---
71---------- Darwin	IIIw	99	35	47	63	---	---
119D---------- Elco	IIIe	104	34	44	60	4.1	6.8
119D3---------- Elco	IVe	93	31	39	53	3.7	6.1
150---------- Onarga	I	90	32	40	70	3.0	6.0
242A---------- Kendall	IIw	135	41	55	75	5.2	8.7
257A---------- Clarksdale	I	140	43	57	79	5.3	8.8
257B---------- Clarksdale	IIe	139	43	56	78	5.2	8.7
264F---------- El Dara	VIe	---	---	---	---	2.0	2.5
264G---------- El Dara	VIIe	---	---	---	---	---	2.0
274F---------- Seaton	VIe	---	---	---	---	3.6	5.9
274G---------- Seaton	VIIe	---	---	---	---	---	4.5
278---------- Stronghurst	IIw	138	42	55	76	5.3	8.8
279A---------- Rozetta	I	131	40	54	73	5.2	8.7
279B---------- Rozetta	IIe	130	40	53	72	5.1	8.6
279C2---------- Rozetta	IIIe	123	38	51	69	4.9	8.2
279C3---------- Rozetta	IVe	113	35	47	64	4.5	7.6
280B---------- Fayette	IIe	128	39	52	72	5.1	8.6
280C2---------- Fayette	IIIe	121	37	50	69	4.9	8.2

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Alfalfa-orchardgrass hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
280C3---------- Fayette	IVe	112	34	46	64	4.5	7.6
280D2---------- Fayette	IIIe	116	36	48	66	4.7	7.8
280D3---------- Fayette	IVe	107	32	44	61	4.3	7.2
284---------- Tice	IIIw	92	28	37	50	3.4	5.7
331A---------- Haymond	IIw	140	45	60	77	5.3	8.8
333---------- Wakeland	IIw	135	45	57	74	5.2	8.7
336---------- Wilbur	I	125	44	58	68	4.1	8.2
386B---------- Downs	IIe	147	43	58	82	5.5	9.2
404---------- Titus	IIIw	125	42	52	68	---	---
415---------- Orion	IIw	135	43	52	75	4.7	7.8
428---------- Coffeen	I	152	47	57	79	5.8	9.7
430B---------- Raddle	IIe	148	45	58	82	5.7	9.6
470C---------- Keller	IIIe	90	32	42	57	3.8	6.4
551F, 551G------ Gosport	VIIe	---	---	---	---	1.3	2.1
570B---------- Martinsville	IIe	120	42	48	65	4.0	8.0
570C2---------- Martinsville	IIIe	105	37	42	62	3.4	6.8
605D2---------- Ursa	IVe	57	16	20	34	2.2	3.6
800B. Psamments							
806F. Orthents							
864**, 865**. Pits							

See footnotes at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Winter wheat	Oats	Alfalfa-orchardgrass hay	Bromegrass-alfalfa
		Bu	Bu	Bu	Bu	Tons	AUM*
937F---------- Seaton-Hickory	VIe	---	---	---	---	3.1	5.8
937G---------- Seaton-Hickory	VIIe	---	---	---	---	---	3.5
967F---------- Hickory-Gosport	VIIe	---	---	---	---	1.9	3.7
1404---------- Titus	Vw	---	---	---	---	---	---
3070---------- Beaucoup	IVw	---	30	---	---	---	---
4071---------- Darwin	Vw	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
6C2, 6C3-------- Fishhook	4C	Slight	Slight	Slight	Moderate	White oak---------- Northern red oak---- Green ash---------- Bur oak----------	70 70 --- ---	52 52 --- ---	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
7D2, 7D3-------- Atlas	4C	Slight	Slight	Moderate	Moderate	White oak---------- Northern red oak---- Bur oak---------- Green ash----------	70 70 70 ---	52 52 52 ---	Green ash, pin oak, red maple, Austrian pine.
8F-------------- Hickory	5R	Moderate	Moderate	Slight	Slight	White oak---------- Northern red oak---- Black oak---------- Green ash---------- Bitternut hickory--- Yellow-poplar-------	85 85 --- --- --- 95	67 67 --- --- --- 98	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
8G-------------- Hickory	5R	Severe	Severe	Slight	Slight	White oak---------- Northern red oak---- Black oak---------- Green ash---------- Bitternut hickory--- Yellow-poplar-------	85 85 --- --- --- 95	67 67 --- --- --- 98	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
17A, 17B-------- Keomah	3A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak----	65 70	48 52	Eastern white pine, white oak, red pine, northern red oak, black walnut, sugar maple.
19C3, 19D3------ Sylvan	6A	Slight	Slight	Slight	Slight	Yellow-poplar------- White oak---------- Northern red oak---- Black walnut--------	90 80 80 ---	90 62 62 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.
19F3------------ Sylvan	6R	Moderate	Moderate	Moderate	Slight	Yellow-poplar------- White oak---------- Northern red oak---- Black walnut--------	90 80 80 ---	90 62 62 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine, sugar maple.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
26---------- Wagner	4W	Slight	Severe	Severe	Severe	Pin oak---------- Blackjack oak------- Black oak-----------	70 60 55	52 43 38	Pin oak, baldcypress, water tupelo, red maple, swamp white oak.
30G---------- Hamburg	2R	Severe	Severe	Severe	Slight	White oak---------- Bur oak---------- Eastern redcedar---- Post oak---------- Black oak----------	45 --- --- --- ---	30 --- --- --- ---	Bur oak, eastern redcedar, white oak.
61---------- Atterberry	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Green ash---------- Bur oak----------	70 70 --- ---	52 52 --- ---	Eastern white pine, red pine, Scotch pine, eastern redcedar.
70---------- Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak---------- Eastern cottonwood-- Sweetgum---------- Cherrybark oak------ American sycamore---	90 100 --- --- ---	72 128 --- --- ---	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
71---------- Darwin	4W	Slight	Severe	Severe	Slight	Pin oak---------- Swamp white oak----- Eastern cottonwood-- Green ash---------- American sycamore---	80 --- --- --- ---	62 --- --- --- ---	Eastern cottonwood, American sycamore, red maple, green ash, pin oak.
119D, 119D3----- Elco	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Black walnut--------	80 --- ---	62 --- ---	White oak, northern red oak, black walnut, green ash, eastern white pine, white ash.
242A---------- Kendall	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Yellow-poplar------- Black walnut--------	80 80 90 ---	62 62 90 ---	White oak, black walnut, northern red oak, green ash, eastern white pine, red pine.
257A, 257B------ Clarksdale	4A	Slight	Slight	Slight	Slight	White oak---------- Northern red oak---- Yellow-poplar------- Black walnut--------	80 80 90 ---	62 62 90 ---	Black walnut, American sycamore, yellow-poplar, white oak, green ash.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
264F---------- El Dara	4R	Moderate	Moderate	Moderate	Slight	White oak----------	80	62	Eastern white pine, black walnut, red pine, yellow-poplar, green ash.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
264G---------- El Dara	4R	Severe	Severe	Moderate	Slight	White oak----------	80	62	Eastern white pine, black walnut, red pine, yellow-poplar, green ash.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
274F---------- Seaton	6R	Moderate	Moderate	Moderate	Slight	Yellow-poplar-------	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak----------	90	72	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
274G---------- Seaton	6R	Severe	Severe	Severe	Slight	Yellow-poplar-------	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak----------	90	72	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
278---------- Stronghurst	4A	Slight	Slight	Slight	Slight	White oak----------	70	52	Eastern white pine, red pine, Scotch pine, eastern redcedar.
						Northern red oak----	70	52	
						Green ash----------	---	---	
						Bur oak------------	---	---	
279A, 279B, 279C2, 279C3--- Rozetta	4A	Slight	Slight	Slight	Slight	White oak----------	80	62	Eastern white pine, northern red oak, green ash, Scotch pine, yellow-poplar.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
280B, 280C2, 280C3, 280D2, 280D3---------- Fayette	4A	Slight	Slight	Slight	Slight	White oak----------	80	62	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
284---------- Tice	5A	Slight	Slight	Slight	Slight	Pin oak------------	96	78	American sycamore, eastern cottonwood, green ash, yellow-poplar, red maple, cherrybark oak.
						Sweetgum-----------	86	95	
						Yellow-poplar-------	90	90	
						Virginia pine-------	90	135	
						Eastern cottonwood--	---	---	
						White ash----------	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
331A---------- Haymond	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	100	107	Eastern white pine, black walnut, yellow-poplar, black locust.
						White oak----------	90	72	
						Black walnut--------	70	---	
333---------- Wakeland	5A	Slight	Slight	Slight	Slight	Pin oak----------	90	72	Eastern white pine, baldcypress, American sycamore, red maple, white ash.
						Sweetgum----------	88	101	
						Yellow-poplar-------	90	90	
						Virginia pine-------	85	129	
336---------- Wilbur	8A	Slight	Slight	Slight	Slight	Yellow-poplar-------	100	107	Eastern white pine, black walnut, yellow-poplar, black locust.
386B---------- Downs	4A	Slight	Slight	Slight	Slight	White oak----------	80	62	Eastern white pine, northern red oak, green ash, yellow-poplar.
						Northern red oak----	80	62	
						Yellow-poplar-------	90	90	
						Black walnut--------	---	---	
404---------- Titus	2W	Slight	Severe	Severe	Moderate	Silver maple--------	76	30	Pin oak, swamp white oak, green ash, water tupelo, eastern cottonwood, American sycamore, hackberry, red maple, silver maple.
						Eastern cottonwood--	99	125	
						White ash----------	---	---	
415---------- Orion	2W	Slight	Moderate	Slight	Slight	Silver maple--------	80	34	White spruce, silver maple, white ash, eastern cottonwood.
						Red maple----------	---	---	
						White ash----------	---	---	
428---------- Coffeen	6W	Slight	Moderate	Slight	Slight	Yellow-poplar-------	90	90	Eastern cottonwood, yellow-poplar, pin oak, American sycamore, sweetgum, red maple.
						Eastern cottonwood--	100	---	
						Pin oak----------	90	72	
551F---------- Gosport	2R	Moderate	Moderate	Severe	Severe	White oak----------	45	30	Eastern white pine, red pine, Norway spruce, Scotch pine, white spruce, cottonwood.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
551G---------- Gosport	2R	Severe	Severe	Severe	Severe	White oak----------	45	30	Eastern white pine, red pine, Norway spruce, Scotch pine, white spruce, cottonwood.
570B, 570C2----- Martinsville	4A	Slight	Slight	Slight	Slight	White oak----------	80	62	Eastern white pine, red pine, white ash, yellow-poplar, black walnut, black locust.
						Yellow-poplar-------	98	104	
						Sweetgum----------	76	70	
605D2---------- Ursa	4A	Slight	Slight	Slight	Slight	White oak----------	70	52	Austrian pine, green ash, red maple, eastern redcedar, pin oak.
						Northern red oak----	70	52	
						Black oak----------	70	52	
						Green ash----------	---	---	
937F**: Seaton---------	6R	Moderate	Moderate	Moderate	Slight	Yellow-poplar-------	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak----------	90	72	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
Hickory--------	5R	Moderate	Moderate	Slight	Slight	White oak----------	85	67	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	67	
						Black oak----------	---	---	
						Green ash----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	98	
937G**: Seaton---------	6R	Severe	Severe	Severe	Slight	Yellow-poplar-------	90	90	White oak, black walnut, northern red oak, green ash, red pine, sugar maple.
						White oak----------	90	72	
						Northern red oak----	80	62	
						Black walnut--------	---	---	
Hickory--------	5R	Severe	Severe	Slight	Slight	White oak----------	85	67	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	67	
						Black oak----------	---	---	
						Green ash----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	98	
967F**: Hickory--------	5R	Moderate	Moderate	Slight	Slight	White oak----------	85	67	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	67	
						Black oak----------	---	---	
						Green ash----------	---	---	
						Bitternut hickory---	---	---	
						Yellow-poplar-------	95	98	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Common trees	Site index	Volume*	
967F**: Gosport	2R	Moderate	Moderate	Severe	Severe	White oak	45	30	Eastern white pine, red pine, Norway spruce, Scotch pine, white spruce, cottonwood.
1404 Titus	2W	Slight	Severe	Severe	Moderate	Silver maple Eastern cottonwood White ash	76 99 ---	30 125 ---	Pin oak, swamp white oak, green ash, water tupelo, eastern cottonwood, American sycamore, hackberry, red maple, silver maple.
3070 Beaucoup	5W	Slight	Severe	Moderate	Moderate	Pin oak Eastern cottonwood Sweetgum Cherrybark oak American sycamore	90 100 --- --- ---	72 128 --- --- ---	Eastern cottonwood, red maple, American sycamore, sweetgum, pin oak.
4071 Darwin	4W	Slight	Severe	Severe	Moderate	Pin oak Swamp white oak Eastern cottonwood Green ash American sycamore	80 --- --- --- ---	62 --- --- --- ---	Eastern cottonwood, American sycamore, red maple, green ash, pin oak.

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

(The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil)

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
6C2, 6C3---------- Fishhook	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
7D2, 7D3---------- Atlas	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
8F, 8G---------- Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
16---------- Rushville	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
17A, 17B---------- Keomah	Silky dogwood, Amur honeysuckle, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
19C3, 19D3, 19F3-- Sylvan	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
26---------- Wagner	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
30G---------- Hamburg	Osageorange, Russian-olive, eastern redcedar, Washington hawthorn.	Honeylocust, northern catalpa, bur oak, black locust, green ash.	Siberian elm----------	---
43A, 43B---------- Ipava	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
45---------- Denny	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, northern white-cedar, Norway spruce, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
46---------- Herrick	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
50---------- Virden	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
61---------- Atterberry	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
70---------- Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine----	Pin oak.
71---------- Darwin	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, Washington hawthorn, white fir.	Eastern white pine----	Pin oak.
119D, 119D3------- Elco	Silky dogwood, honeysuckle, Amur privet, American cranberrybush.	Northern white-cedar, Washington hawthorn, blue spruce, white fir.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
150---------- Onarga	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, northern white-cedar, white fir, Washington hawthorn, blue spruce.	Norway spruce---------	Eastern white pine, pin oak.
242A---------- Kendall	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
257A, 257B-------- Clarksdale	American cranberrybush, Amur honeysuckle, silky dogwood, Amur privet.	Washington hawthorn, northern white-cedar, blue spruce, white fir, Austrian pine.	Norway spruce---------	Eastern white pine, pin oak.
264F, 264G-------- El Dara	Amur privet, Washington hawthorn, Amur honeysuckle, American cranberrybush, Tatarian honeysuckle.	Austrian pine, northern white-cedar, osageorange, eastern redcedar.	Norway spruce, eastern white pine, red pine.	---

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
274F, 274G-------- Seaton	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
278---------- Stronghurst	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
279A, 279B, 279C2, 279C3---------- Rozetta	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
280B, 280C2, 280C3, 280D2, 280D3---------- Fayette	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
284---------- Tice	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
331A---------- Haymond	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
333---------- Wakeland	Amur honeysuckle, silky dogwood, Amur privet, American cranberrybush, silky dogwood.	Northern white-cedar, Austrian pine, white fir, blue spruce, Washington hawthorn.	---	Eastern white pine, pin oak.
336---------- Wilbur	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
386B---------- Downs	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
404---------- Titus	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine----	Pin oak.
415---------- Orion	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
428---------- Coffeen	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	Austrian pine, white fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce---------	Eastern white pine, pin oak.
430B---------- Raddle	Amur privet, Amur honeysuckle, American cranberrybush, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
470C---------- Keller	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
551F, 551G-------- Gosport	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, Tatarian honeysuckle, American cranberrybush.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---
570B, 570C2------- Martinsville	Amur honeysuckle, American cranberrybush, Amur privet, silky dogwood.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
605D2---------- Ursa	American cranberrybush, Tatarian honeysuckle, Amur honeysuckle, arrowwood, Amur privet, Washington hawthorn, eastern redcedar.	Osageorange, green ash, Austrian pine.	Pin oak, eastern white pine.	---
800B. Psamments				
806F. Orthents				
864*, 865*. Pits				
937F*, 937G*: Seaton----------	Silky dogwood, Amur privet, Amur honeysuckle, American cranberrybush.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.

See footnote at end of table.

TABLE 8.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average height, in feet, of--			
	8-15	16-25	26-35	>35
937F*, 937G*: Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
967F*: Hickory	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	White fir, blue spruce, northern white-cedar, Washington hawthorn.	Norway spruce, Austrian pine.	Eastern white pine, pin oak.
Gosport	Eastern redcedar, Washington hawthorn, Amur privet, arrowwood, Amur honeysuckle, Tatarian honeysuckle, American cranberrybush.	Austrian pine, green ash, osageorange.	Eastern white pine, pin oak.	---
1404 Titus	Silky dogwood, American cranberrybush, Amur honeysuckle, Amur privet.	Washington hawthorn, white fir, blue spruce, northern white-cedar, Austrian pine, Norway spruce.	Eastern white pine	Pin oak.
3070 Beaucoup	Silky dogwood, Amur privet, American cranberrybush, Amur honeysuckle.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, white fir, Washington hawthorn.	Eastern white pine	Pin oak.
4071 Darwin	Amur privet, silky dogwood, Amur honeysuckle, American cranberrybush.	Norway spruce, Austrian pine, northern white-cedar, blue spruce, Washington hawthorn, white fir.	Eastern white pine	Pin oak.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
6C2, 6C3 Fishhook	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
7D2 Atlas	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness, erodes easily.	Severe: wetness.
7D3 Atlas	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: slope, wetness, percs slowly.	Severe: wetness.	Severe: wetness.
8F Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
8G Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
16 Rushville	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
17A Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Slight	Slight.
17B Keomah	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
19C3 Sylvan	Slight	Slight	Severe: slope.	Slight	Slight.
19D3 Sylvan	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
19F3 Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
26 Wagner	Severe: flooding, wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.
30G Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
43A, 43B Ipava	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
45 Denny	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
46--- Herrick	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
50--- Virden	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
61--- Atterberry	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
70--- Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
71--- Darwin	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, percs slowly.	Severe: ponding, too clayey.	Severe: ponding, too clayey.
119D, 119D3--- Elco	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
150--- Onarga	Severe: flooding.	Slight---	Slight---	Slight---	Slight.
242A--- Kendall	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
257A, 257B--- Clarksdale	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
264F--- El Dara	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
264G--- El Dara	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
274F--- Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
274G--- Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
278--- Stronghurst	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
279A--- Rozetta	Slight---	Slight---	Slight---	Slight---	Slight.
279B--- Rozetta	Slight---	Slight---	Moderate: slope.	Slight---	Slight.
279C2, 279C3--- Rozetta	Slight---	Slight---	Severe: slope.	Slight---	Slight.
280B--- Fayette	Slight---	Slight---	Moderate: slope.	Slight---	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
280C2, 280C3---------- Fayette	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
280D2, 280D3---------- Fayette	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
284---------- Tice	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Severe: flooding.
331A---------- Haymond	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
333---------- Wakeland	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: wetness, flooding.	Moderate: flooding, wetness.	Severe: flooding.
336---------- Wilbur	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Slight----------	Moderate: wetness.
386B---------- Downs	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
404---------- Titus	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
415---------- Orion	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
428---------- Coffeen	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
430B---------- Raddle	Severe: flooding.	Slight----------	Moderate: slope.	Slight----------	Slight.
470C---------- Keller	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness.
551F---------- Gosport	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
551G---------- Gosport	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, erodes easily.	Severe: slope.
570B---------- Martinsville	Slight----------	Slight----------	Moderate: slope, small stones.	Slight----------	Slight.
570C2---------- Martinsville	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.
605D2---------- Ursa	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
800B. Psamments					

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
806F. Orthents					
864*, 865*. Pits					
937F*: Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
937G*: Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
967F*: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Gosport	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: slope, percs slowly.	Severe: erodes easily.	Severe: slope.
1404 Titus	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
3070 Beaucoup	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
4071 Darwin	Severe: flooding, ponding, percs slowly.	Severe: ponding, too clayey, percs slowly.	Severe: too clayey, ponding, flooding.	Severe: ponding, too clayey.	Severe: ponding, flooding, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
6C2, 6C3---------- Fishhook	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
7D2, 7D3---------- Atlas	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
8F---------- Hickory	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
8G---------- Hickory	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
16---------- Rushville	Poor	Fair	Poor	Fair	Fair	Good	Good	Poor	Fair	Good.
17A, 17B---------- Keomah	Good	Good	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair.
19C3, 19D3--------- Sylvan	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
19F3---------- Sylvan	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
26---------- Wagner	Good	Good	Fair	Fair	Fair	Good	Good	Good	Fair	Fair.
30G---------- Hamburg	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
43A---------- Ipava	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
43B---------- Ipava	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
45---------- Denny	Good	Good	Good	Fair	Fair	Good	Good	Good	Fair	Good.
46---------- Herrick	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
50---------- Virden	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
61---------- Atterberry	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
70---------- Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Good	Good.
71---------- Darwin	Fair	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Fair.
119D, 119D3-------- Elco	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
150---------- Onarga	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
242A---------- Kendall	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
257A---------- Clarksdale	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
257B---------- Clarksdale	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
264F---------- El Dara	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
264G---------- El Dara	Poor	Poor	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
274F---------- Seaton	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
274G---------- Seaton	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
278---------- Stronghurst	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
279A, 279B--------- Rozetta	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
279C2, 279C3------- Rozetta	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280B---------- Fayette	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
280C2---------- Fayette	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
280C3---------- Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
280D2---------- Fayette	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
280D3---------- Fayette	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
284---------- Tice	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
331A---------- Haymond	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
333---------- Wakeland	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
336---------- Wilbur	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
386B---------- Downs	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
404---------- Titus	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.

TABLE 10.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
415---------- Orion	Good	Good	Good	Good	Good	Good	Fair	Good	Good	Good.
428---------- Coffeen	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
430B---------- Raddle	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
470C---------- Keller	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
551F, 551G--------- Gosport	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
570B---------- Martinsville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
570C2---------- Martinsville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
605D2---------- Ursa	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
800B. Psamments										
806F. Orthents										
864*, 865*. Pits										
937F*:										
Seaton----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
937G*:										
Seaton----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Hickory----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
967F*:										
Hickory----------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Gosport----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
1404---------- Titus	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
3070---------- Beaucoup	Good	Good	Good	Fair	Fair	Good	Good	Good	Good	Good.
4071---------- Darwin	Poor	Poor	Fair	Poor	Poor	Good	Good	Poor	Poor	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
6C2, 6C3---------- Fishhook	Severe: wetness.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
7D2, 7D3---------- Atlas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness.	Severe: wetness.
8F, 8G---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
16---------- Rushville	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
17A, 17B---------- Keomah	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, frost action, low strength.	Slight.
19C3---------- Sylvan	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
19D3---------- Sylvan	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
19F3---------- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
26---------- Wagner	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness.
30G---------- Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
43A, 43B---------- Ipava	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
45---------- Denny	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
46---------- Herrick	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, frost action, shrink-swell.	Moderate: wetness.
50---------- Virden	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: low strength, ponding, frost action.	Severe: ponding.
61---------- Atterberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
70---------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.
71---------- Darwin	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, shrink-swell.	Severe: ponding, too clayey.
119D, 119D3------- Elco	Moderate: too clayey, wetness, slope.	Moderate: shrink-swell, slope.	Moderate: wetness, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
150---------- Onarga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding, frost action.	Slight.
242A---------- Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
257A, 257B-------- Clarksdale	Severe: wetness.	Severe: shrink-swell, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, frost action, low strength.	Moderate: wetness.
264F, 264G-------- El Dara	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
274F, 274G-------- Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
278---------- Stronghurst	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.
279A, 279B-------- Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
279C2, 279C3------ Rozetta	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
280B---------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
280C2---------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action, low strength.	Slight.
280C3---------- Fayette	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
280D2---------- Fayette	Moderate: slope.	Moderate: slope, shrink-swell.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action, low strength.	Moderate: slope.
280D3---------- Fayette	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
284---------- Tice	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding, frost action.	Severe: flooding.
331A---------- Haymond	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Severe: flooding.
333---------- Wakeland	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: flooding.
336---------- Wilbur	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Moderate: wetness.
386B---------- Downs	Slight---------	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action, low strength.	Slight.
404---------- Titus	Severe: cutbanks cave, ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding.	Severe: ponding.
415---------- Orion	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, frost action.	Moderate: wetness.
428---------- Coffeen	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: frost action.	Moderate: wetness.
430B---------- Raddle	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
470C---------- Keller	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, frost action.	Moderate: wetness.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
551F, 551G-------- Gosport	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
570B---------- Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell.	Moderate: frost action, shrink-swell.	Slight.
570C2--------- Martinsville	Severe: cutbanks cave.	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Moderate: frost action, shrink-swell.	Slight.
605D2--------- Ursa	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, shrink-swell.	Moderate: slope.
800B. Psamments						
806F. Orthents						
864*, 865*. Pits						
937F*, 937G*: Seaton----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Hickory----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
967F*: Hickory----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Gosport----------	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, shrink-swell.	Severe: slope.
1404---------- Titus	Severe: cutbanks cave, ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
3070---------- Beaucoup	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
4071---------- Darwin	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, too clayey.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
6C2, 6C3---------- Fishhook	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Poor: too clayey, hard to pack.
7D2, 7D3---------- Atlas	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Poor: too clayey, hard to pack.
8F, 8G---------- Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
16---------- Rushville	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
17A, 17B---------- Keomah	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack.
19C3---------- Sylvan	Slight----------	Severe: slope.	Slight----------	Good.
19D3---------- Sylvan	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope.
19F3---------- Sylvan	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
26---------- Wagner	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
30G---------- Hamburg	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
43A, 43B---------- Ipava	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
45---------- Denny	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
46---------- Herrick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
50---------- Virden	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
61---------- Atterberry	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
70---------- Beaucoup	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Poor: ponding.
71---------- Darwin	Severe: ponding, percs slowly.	Slight----------	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
119D, 119D3--------- Elco	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Poor: too clayey.
150---------- Onarga	Moderate: flooding.	Severe: seepage, flooding.	Severe: seepage.	Good.
242A---------- Kendall	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
257A, 257B---------- Clarksdale	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness, too clayey, hard to pack.
264F, 264G---------- El Dara	Severe: slope.	Severe: slope.	Severe: slope.	Poor: seepage, too sandy, slope.
274F, 274G---------- Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
278---------- Stronghurst	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Poor: wetness.
279A---------- Rozetta	Moderate: wetness.	Moderate: seepage, wetness.	Moderate: wetness.	Fair: too clayey.
279B---------- Rozetta	Moderate: wetness.	Moderate: seepage, slope, wetness.	Moderate: wetness.	Fair: too clayey.
279C2, 279C3-------- Rozetta	Moderate: wetness.	Severe: slope.	Moderate: wetness.	Fair: too clayey.
280B---------- Fayette	Slight----------	Moderate: slope, seepage.	Slight----------	Fair: too clayey.
280C2, 280C3-------- Fayette	Slight----------	Severe: slope.	Slight----------	Fair: too clayey.
280D2---------- Fayette	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: slope, too clayey.

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
280D3--- Fayette	Moderate: slope.	Severe: slope.	Moderate: slope.	Fair: too clayey, slope.
284--- Tice	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack.
331A--- Haymond	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
333--- Wakeland	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
336--- Wilbur	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
386B--- Downs	Slight---	Moderate: slope, seepage.	Slight---	Fair: too clayey.
404--- Titus	Severe: ponding, percs slowly.	Slight---	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
415--- Orion	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
428--- Coffeen	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: wetness.
430B--- Raddle	Moderate: flooding.	Moderate: slope, seepage.	Moderate: flooding.	Good.
470C--- Keller	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
551F, 551G--- Gosport	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
570B--- Martinsville	Slight---	Severe: seepage.	Slight---	Fair: thin layer.
570C2--- Martinsville	Slight---	Severe: seepage, slope.	Slight---	Fair: thin layer.
605D2--- Ursa	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Poor: too clayey, hard to pack.
800B. Psamments				

TABLE 12.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Area sanitary landfill	Daily cover for landfill
806F. Orthents				
864*, 865*. Pits				
937F*, 937G*: Seaton	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
967F*: Hickory	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Gosport	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
1404 Titus	Severe: flooding, ponding, percs slowly.	Slight	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
3070 Beaucoup	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
4071 Darwin	Severe: flooding, ponding, percs slowly.	Severe: flooding.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
6C2 Fishhook	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
6C3 Fishhook	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
7D2, 7D3 Atlas	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
8F Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
8G Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
16 Rushville	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
17A, 17B Keomah	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
19C3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
19D3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
19F3 Sylvan	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
26 Wagner	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
30G Hamburg	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
43A, 43B Ipava	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
45 Denny	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
46 Herrick	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
50 Virden	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
61---------- Atterberry	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
70---------- Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
71---------- Darwin	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
119D---------- Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer, slope.
119D3---------- Elco	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer, slope.
150---------- Onarga	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
242A---------- Kendall	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
257A, 257B---------- Clarksdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
264F---------- El Dara	Fair: slope.	Probable----------	Improbable: too sandy.	Poor: slope.
264G---------- El Dara	Poor: slope.	Probable----------	Improbable: too sandy.	Poor: slope.
274F---------- Seaton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
274G---------- Seaton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
278---------- Stronghurst	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
279A, 279B, 279C2----- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
279C3---------- Rozetta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280B, 280C2---------- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
280C3---------- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
280D2---------- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
280D3---------- Fayette	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
284---------- Tice	Fair: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
331A---------- Haymond	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
333---------- Wakeland	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
336---------- Wilbur	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
386B---------- Downs	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
404---------- Titus	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
415---------- Orion	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
428---------- Coffeen	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
430B---------- Raddle	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
470C---------- Keller	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
551F---------- Gosport	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
551G---------- Gosport	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
570B, 570C2---------- Martinsville	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
605D2---------- Ursa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
800B. Psamments				
806F. Orthents				
864*, 865*. Pits				
937F*: Seaton----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
937F*: Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
937G*: Seaton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hickory	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
967F*: Hickory	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Gosport	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
1404 Titus	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
3070 Beaucoup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
4071 Darwin	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
6C2, 6C3---------- Fishhook	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Wetness, erodes easily.
7D2---------- Atlas	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, erodes easily, wetness.	Wetness, slope, erodes easily.
7D3---------- Atlas	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Slope, wetness.	Wetness, slope.
8F, 8G---------- Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
16---------- Rushville	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
17A---------- Keomah	Slight---------	Severe: hard to pack.	Frost action, percs slowly.	Wetness, percs slowly.	Wetness, erodes easily, percs slowly.	Erodes easily, percs slowly.
17B---------- Keomah	Moderate: slope.	Severe: hard to pack.	Slope, frost action, percs slowly.	Wetness, slope, percs slowly.	Wetness, erodes easily, percs slowly.	Erodes easily, percs slowly.
19C3---------- Sylvan	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
19D3, 19F3-------- Sylvan	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
26---------- Wagner	Slight---------	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
30G---------- Hamburg	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
43A---------- Ipava	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
43B---------- Ipava	Moderate: slope.	Severe: wetness.	Frost action, slope.	Wetness, slope.	Erodes easily, wetness.	Wetness, erodes easily.
45---------- Denny	Slight---------	Severe: ponding.	Ponding, percs slowly, frost action.	Ponding, percs slowly, erodes easily.	Erodes easily, ponding.	Wetness, erodes easily, percs slowly.
46---------- Herrick	Slight---------	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
50---------- Virden	Slight---------	Severe: hard to pack, ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
61---------- Atterberry	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness--------	Erodes easily, wetness.	Wetness, erodes easily.
70---------- Beaucoup	Slight---------	Severe: ponding.	Ponding, frost action.	Ponding--------	Ponding--------	Wetness.
71---------- Darwin	Slight---------	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
119D, 119D3------- Elco	Severe: slope.	Moderate: piping, wetness.	Frost action, slope.	Wetness, slope, erodes easily.	Slope, erodes easily, wetness.	Slope, erodes easily.
150---------- Onarga	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
242A---------- Kendall	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
257A---------- Clarksdale	Slight---------	Severe: wetness.	Frost action---	Wetness, erodes easily.	Wetness, erodes easily.	Wetness, erodes easily.
257B---------- Clarksdale	Moderate: slope.	Severe: wetness.	Slope, frost action.	Wetness, slope, erodes easily.	Wetness, erodes easily.	Wetness, erodes easily.
264F, 264G-------- El Dara	Severe: slope.	Severe: seepage, piping.	Deep to water	Soil blowing, slope.	Slope, too sandy, soil blowing.	Slope.
274F, 274G-------- Seaton	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
278---------- Stronghurst	Moderate: seepage.	Severe: wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
279A---------- Rozetta	Moderate: seepage.	Slight---------	Deep to water	Erodes easily	Erodes easily	Erodes easily.
279B, 279C2, 279C3---------- Rozetta	Moderate: seepage, slope.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280B, 280C2------- Fayette	Moderate: slope, seepage.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280C3---------- Fayette	Moderate: seepage, slope.	Slight---------	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
280D2, 280D3------ Fayette	Severe: slope.	Slight---------	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
284---------- Tice	Moderate: seepage.	Severe: wetness.	Flooding, frost action.	Wetness--------	Wetness--------	Favorable.
331A---------- Haymond	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-------	Erodes easily	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
333---------- Wakeland	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
336---------- Wilbur	Moderate: seepage.	Severe: piping, wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
386B---------- Downs	Moderate: slope, seepage.	Slight---------	Deep to water	Slope----------	Erodes easily	Erodes easily.
404---------- Titus	Slight---------	Severe: ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
415---------- Orion	Moderate: seepage.	Severe: piping, wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
428---------- Coffeen	Severe: seepage.	Severe: piping, wetness.	Frost action---	Wetness--------	Wetness--------	Wetness.
430B---------- Raddle	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
470C---------- Keller	Moderate: seepage, slope.	Moderate: hard to pack, wetness.	Percs slowly, frost action, slope.	Wetness, percs slowly, slope.	Erodes easily, wetness.	Wetness, erodes easily.
551F, 551G-------- Gosport	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, rooting depth.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
570B, 570C2------- Martinsville	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Erodes easily	Erodes easily.
605D2---------- Ursa	Severe: slope.	Moderate: hard to pack.	Deep to water	Percs slowly, slope.	Slope, erodes easily, percs slowly.	Slope, erodes easily.
800B. Psamments						
806F. Orthents						
864*, 865*. Pits						
937F*, 937G*:						
Seaton----------	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Hickory----------	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
967F*:						
Hickory	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Gosport	Severe: slope.	Severe: hard to pack.	Deep to water	Percs slowly, depth to rock, rooting depth.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
1404 Titus	Slight	Severe: ponding.	Ponding, percs slowly, flooding.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
3070 Beaucoup	Slight	Severe: ponding.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding	Wetness.
4071 Darwin	Slight	Severe: hard to pack, ponding.	Ponding, percs slowly, flooding.	Ponding, slow intake, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
6C2---------- Fishhook	0-6	Silt loam--------	CL, CL-ML, ML	A-4, A-6	0	100	100	95-100	85-100	25-40	5-15
	6-32	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
	32-60	Clay loam, clay, silty clay loam.	CH, CL	A-7	0-5	95-100	90-100	80-90	75-85	40-60	20-35
6C3---------- Fishhook	0-5	Silty clay loam	ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-20
	5-31	Silty clay loam	CL, ML	A-6, A-7	0	100	100	95-100	90-100	35-50	10-25
	31-60	Clay loam, clay, silty clay loam.	CH, CL	A-7	0-5	95-100	90-100	80-90	75-85	40-60	20-35
7D2---------- Atlas	0-7	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	75-95	25-35	5-15
	7-51	Silty clay loam, clay, clay loam.	CH	A-7	0	100	95-100	95-100	80-95	50-70	30-45
	51-60	Clay loam, loam	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	75-95	35-55	20-30
7D3---------- Atlas	0-8	Clay loam--------	CH, CL	A-7	0	100	100	95-100	75-95	45-65	30-40
	8-41	Silty clay loam, clay, clay loam.	CH	A-7	0	100	95-100	95-100	80-95	50-70	30-45
	41-60	Clay loam, loam	CH, CL	A-6, A-7	0-5	95-100	90-100	90-100	75-95	35-55	20-30
8F, 8G---------- Hickory	0-5	Loam----------	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	5-43	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
	43-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	80-95	80-95	60-80	20-40	5-20
16---------- Rushville	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	8-13	Silt loam, silt	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-40	NP-15
	13-25	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	95-100	45-60	20-40
	25-46	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	95-100	45-60	15-30
	46-60	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	0	100	100	95-100	90-100	30-45	8-20
17A, 17B---------- Keomah	0-9	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	9-56	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	100	95-100	45-60	30-45
	56-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-50	15-30
19C3, 19D3------- Sylvan	0-7	Silty clay loam	CL	A-7, A-6	0	100	100	100	95-100	35-50	20-30
	7-27	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
19F3---------- Sylvan	0-7	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	7-27	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	95-100	95-100	20-40	5-20
26---------- Wagner	0-8	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	24-35	6-15
	8-16	Silt loam--------	ML, CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	16-60	Silty clay, silty clay loam.	CH, CL	A-7	0	100	100	95-100	90-100	45-60	25-40
30G---------- Hamburg	0-16	Silt----------	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5
	16-60	Silt loam, very fine sandy loam, silt.	CL-ML, ML	A-4	0	100	100	100	95-100	<25	NP-5

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
43A, 43B--------- Ipava	0-14	Silt loam---------	ML, CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	14-54	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-70	25-40
	54-60	Silt loam---------	CL	A-6	0	100	100	95-100	90-100	30-40	10-20
45---------- Denny	0-9	Silt loam---------	CL	A-6, A-4	0	100	100	95-100	95-100	30-40	8-15
	9-15	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	15-47	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-60	15-35
	47-60	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	95-100	25-40	11-20
46---------- Herrick	0-18	Silt loam---------	CL, ML	A-4, A-6	0	100	100	95-100	90-100	30-40	5-15
	18-56	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	45-60	25-40
	56-60	Silt loam, loam, clay loam.	CL	A-6	0	100	100	90-100	80-95	30-40	10-20
50---------- Virden	0-14	Silty clay loam	CL	A-7, A-6	0	100	100	98-100	95-100	30-45	10-20
	14-48	Silty clay, silty clay loam.	CH, CL, MH, ML	A-7	0	100	100	98-100	95-100	40-55	15-25
	48-60	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	98-100	90-100	30-45	10-20
61---------- Atterberry	0-12	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	25-40	5-15
	12-60	Silty clay loam, silt loam.	CL, CH	A-7, A-6	0	100	100	95-100	95-100	35-55	20-30
70---------- Beaucoup	0-11	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
	11-47	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
	47-60	Stratified very fine sandy loam to silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	100	100	90-100	65-95	25-45	5-25
71---------- Darwin	0-20	Silty clay-------	CH, CL	A-7	0	100	100	100	90-100	50-85	25-50
	20-60	Silty clay, clay	CH, CL	A-7	0	100	100	100	85-100	45-80	25-50
119D---------- Elco	0-10	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	10-34	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	34-60	Silty clay loam, loam, clay.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30
119D3--------- Elco	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	85-100	30-45	15-30
	6-25	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	95-100	85-100	25-45	11-30
	25-60	Silty clay loam, loam, clay.	CL	A-7, A-6	0	100	90-100	80-100	60-95	25-50	11-30
150---------- Onarga	0-13	Loam----------	SM, SC, SM-SC	A-4, A-2-4	0	100	100	70-85	25-50	<20	NP-10
	13-52	Sandy clay loam, fine sandy loam, loam.	CL-ML, CL, SM-SC, SC	A-4, A-6, A-2-4, A-2-6	0	95-100	95-100	60-85	30-55	15-30	5-15
	52-60	Loamy fine sand, fine sandy loam.	SM, SM-SC	A-2-4	0	90-100	90-100	60-85	15-35	<20	NP-5
242A--------- Kendall	0-16	Silt loam---------	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	20-35	5-15
	16-50	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	90-100	30-45	10-20
	50-60	Stratified sandy loam to silt loam.	CL, CL-ML, SM-SC, SC	A-2, A-4	0-5	90-100	80-95	60-90	30-70	<25	4-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
257A, 257B-------	0-12	Silt loam--------	CL	A-6	0	100	100	95-100	90-100	25-40	10-20
Clarksdale	12-51	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	40-65	25-40
	51-60	Silt loam, silty clay loam.	CL	A-6	0	98-100	98-100	95-100	90-100	25-40	10-25
264F, 264G-------	0-3	Fine sandy loam	CL, SM, SC, ML	A-4	0	100	100	95-100	45-60	<25	NP-10
El Dara	3-14	Fine sandy loam, loam, silt loam.	SM, SC, SM-SC	A-4, A-2	0	100	95-100	95-100	30-50	<20	NP-10
	14-36	Sandy clay loam, clay loam, sandy loam.	SC, CL	A-6, A-2-6	0	95-100	95-100	95-100	30-60	20-35	10-20
	36-60	Sandy loam, loamy sand, sand.	SM, SM-SC, SC, SP-SM	A-2	0	100	95-100	95-100	10-30	<20	NP-10
274F, 274G-------	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
Seaton	7-43	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	43-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
278--------------	0-14	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	95-100	95-100	25-35	5-15
Stronghurst	14-53	Silty clay loam	CL	A-7	0	100	100	100	98-100	41-50	19-28
	53-60	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	98-100	95-100	26-37	5-15
279A, 279B, 279C2----	0-9	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	95-100	24-35	8-15
Rozetta	9-60	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
279C3----------	0-7	Silty clay loam	ML, CL	A-6, A-7	0	100	100	95-100	95-100	35-45	10-20
Rozetta	7-42	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	95-100	35-50	15-30
	42-60	Silt loam--------	CL	A-6	0	100	100	95-100	95-100	25-40	10-20
280B, 280C2------	0-12	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
Fayette	12-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
280C3----------	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
Fayette	6-42	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	42-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
280D2----------	0-12	Silt loam--------	CL-ML, CL	A-4, A-6	0	100	100	100	95-100	25-35	5-15
Fayette	12-60	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
280D3----------	0-6	Silty clay loam	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
Fayette	6-42	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	100	95-100	35-45	15-25
	42-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
284--------------	0-12	Silt loam--------	CL	A-6, A-7	0	100	100	90-100	80-95	30-45	10-20
Tice	12-49	Silty clay loam, silt loam.	CL, CH	A-7	0	100	100	95-100	85-95	40-55	15-30
	49-60	Stratified silty clay loam to loam.	CL-ML, CL	A-4, A-6, A-7	0	100	100	60-95	55-80	25-45	5-20
331A-------------	0-8	Silt loam--------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
Haymond	8-46	Silt loam--------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	46-60	Fine sandy loam, silt loam, loam.	ML, SM	A-4	0	95-100	90-100	80-100	35-90	27-36	4-10

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
333---------- Wakeland	0-8	Silt loam--------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
	8-60	Silt loam--------	ML	A-4	0	100	100	90-100	80-90	27-36	4-10
336---------- Wilbur	0-9	Silt loam--------	ML, CL-ML	A-4	0	100	100	90-100	70-90	<25	3-7
	9-60	Silt loam--------	ML, CL-ML	A-4	0	100	100	90-100	70-90	<25	3-7
386B---------- Downs	0-9	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	25-35	5-15
	9-50	Silty clay loam, silt loam.	CL	A-7, A-6	0	100	100	100	95-100	35-45	15-25
	50-60	Silt loam--------	CL	A-6	0	100	100	100	95-100	30-40	10-20
404---------- Titus	0-18	Silty clay loam	CH, CL	A-7, A-6	0	100	100	95-100	90-100	40-55	20-30
	18-60	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	40-55	20-30
415---------- Orion	0-5	Silt loam--------	CL, CL-ML	A-4	0	100	100	85-100	80-100	20-30	4-10
	5-25	Stratified silt loam to very fine sand.	CL, CL-ML	A-4	0	100	100	90-100	70-80	20-30	4-10
	25-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	100	100	85-100	85-100	20-40	4-18
428---------- Coffeen	0-15	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	85-100	25-40	5-20
	15-42	Silt loam--------	ML, CL-ML, CL	A-4	0	100	100	90-100	80-95	20-35	3-10
	42-60	Stratified silt loam to sandy loam.	ML, SM, SC, CL	A-4, A-2	0	100	90-100	85-100	30-85	15-30	NP-10
430B---------- Raddle	0-17	Silt loam--------	CL	A-4, A-6	0	100	100	95-100	85-100	25-35	8-15
	17-60	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	20-30	4-14
470C---------- Keller	0-13	Silt loam--------	CL, ML	A-6, A-4	0	100	100	95-100	90-100	30-40	5-15
	13-30	Silty clay loam	CL, ML	A-7, A-6	0	100	100	95-100	90-100	35-50	10-25
	30-60	Silty clay loam, clay loam, clay.	CH, CL	A-7, A-6	0-5	95-100	90-100	80-95	75-90	35-55	15-30
551F, 551G------- Gosport	0-6	Silty clay loam	ML, MH	A-7	0-5	95-100	90-100	85-100	80-100	41-55	11-20
	6-30	Clay, silty clay	CH	A-7	0-5	95-100	90-100	85-100	80-100	50-65	35-50
	30-60	Weathered bedrock	CH	A-7	0-5	95-100	90-100	85-100	80-100	65-80	50-60
570B---------- Martinsville	0-16	Loam----------	CL, CL-ML, ML	A-4	0	100	85-100	75-100	65-90	<25	3-8
	16-41	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-4, A-6, A-2	0	95-100	85-100	70-100	30-95	25-40	7-15
	41-60	Sandy loam, silt loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2, A-4, A-6	0	95-100	85-100	55-95	30-75	20-30	5-11
570C2---------- Martinsville	0-9	Loam----------	CL, CL-ML, ML	A-4	0	100	85-100	75-100	65-90	<25	3-8
	9-28	Clay loam, silty clay loam, sandy clay loam.	CL, SC	A-4, A-6, A-2	0	95-100	85-100	70-100	30-95	25-40	7-15
	28-40	Sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, CL, SC	A-2, A-4, A-6	0	95-100	85-100	55-95	30-75	20-30	5-11
	40-60	Stratified sand to silt loam.	SM, SM-SC, CL-ML	A-4, A-2-4, A-1	0	95-100	85-100	45-95	10-75	<25	NP-8

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
605D2----------	0-14	Loam----------	CL, CL-ML	A-6, A-4	0	100	95-100	90-100	80-100	20-40	5-20
Ursa	14-60	Clay, clay loam, silty clay.	CH, CL	A-7	0-5	95-100	90-95	70-90	55-90	40-60	20-35
800B. Psamments											
806F. Orthents											
864*, 865*. Pits											
937F*:											
Seaton----------	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	7-43	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	43-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
Hickory---------	0-7	Loam----------	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	7-48	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
	48-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	80-95	80-95	60-80	20-40	5-20
937G*:											
Seaton----------	0-7	Silt loam--------	CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	7-43	Silt loam--------	CL, CL-ML	A-6, A-4	0	100	100	100	90-100	25-40	5-20
	43-60	Silt loam, silt	CL, CL-ML	A-4, A-6	0	100	100	100	90-100	25-40	5-20
Hickory---------	0-7	Silt loam--------	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	7-48	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
	48-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	80-95	80-95	60-80	20-40	5-20
967F*:											
Hickory---------	0-10	Silt loam--------	CL	A-6, A-4	0-5	95-100	90-100	90-100	75-95	20-35	8-15
	10-60	Clay loam, silty clay loam.	CL	A-6, A-7	0-5	95-100	90-100	80-95	65-80	30-50	15-30
Gosport---------	0-6	Loam----------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
	6-39	Clay, silty clay	CH	A-7	0	100	100	95-100	85-100	50-65	35-50
	39-60	Weathered bedrock	CH	A-7	0	100	100	95-100	85-100	65-80	50-60
1404----------	0-12	Silty clay loam	CH, CL	A-7	0	100	100	95-100	90-100	40-55	20-30
Titus	12-60	Silty clay loam, silty clay.	CH, CL	A-7	0	100	100	95-100	90-100	40-55	20-30
3070----------	0-11	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-25
Beaucoup	11-60	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	85-100	30-45	15-30
4071----------	0-20	Silty clay-------	CH, CL	A-7	0	100	100	100	90-100	45-85	25-55
Darwin	20-60	Silty clay, clay	CH, CL	A-7	0	100	100	100	85-100	45-85	25-55

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
6C2----------	0-6	20-27	1.30-1.50	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	3	6	1-3
Fishhook	6-32	27-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	32-60	35-45	1.55-1.75	0.06-0.2	0.09-0.16	4.5-7.8	High---------	0.37			
6C3----------	0-5	27-35	1.35-1.55	0.6-2.0	0.20-0.22	5.1-7.3	Moderate-----	0.37	2	7	.5-1
Fishhook	5-31	27-35	1.40-1.60	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	31-60	35-45	1.55-1.75	0.06-0.2	0.09-0.16	4.5-7.8	High---------	0.37			
7D2----------	0-7	20-27	1.30-1.50	0.2-0.6	0.20-0.24	4.5-7.3	Moderate-----	0.43	3	6	1-3
Atlas	7-51	35-45	1.50-1.70	<0.06	0.09-0.13	4.5-7.3	High---------	0.32			
	51-60	20-30	1.55-1.75	0.06-0.2	0.12-0.15	6.1-7.8	Moderate-----	0.32			
7D3----------	0-8	30-40	1.45-1.65	0.06-0.2	0.18-0.20	4.5-7.3	High---------	0.32	2	7	.5-2
Atlas	8-41	35-45	1.50-1.70	<0.06	0.09-0.13	4.5-7.3	High---------	0.32			
	41-60	20-30	1.55-1.75	0.06-0.2	0.12-0.15	6.1-7.8	Moderate-----	0.32			
8F, 8G-------	0-5	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	6	1-2
Hickory	5-43	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.37			
	43-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.37			
16----------	0-8	15-27	1.25-1.45	0.2-0.6	0.22-0.24	4.5-7.3	Low----------	0.43	3	6	1-3
Rushville	8-13	10-22	1.30-1.50	0.06-0.2	0.15-0.20	4.5-6.5	Low----------	0.43			
	13-25	35-45	1.30-1.50	<0.06	0.09-0.20	4.5-6.5	High---------	0.43			
	25-46	30-42	1.40-1.60	<0.2	0.11-0.20	4.5-7.8	High---------	0.43			
	46-60	18-30	1.40-1.55	0.06-0.2	0.16-0.21	5.6-8.4	Moderate-----	0.43			
17A, 17B-----	0-9	16-22	1.30-1.40	0.6-2.0	0.22-0.24	4.5-7.3	Low----------	0.37	5	6	1-2
Keomah	9-56	27-42	1.30-1.45	0.06-0.6	0.18-0.20	4.5-5.5	High---------	0.37			
	56-60	24-38	1.40-1.55	0.2-0.6	0.18-0.20	5.1-6.5	Moderate-----	0.37			
19C3, 19D3---	0-7	27-32	1.25-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Moderate-----	0.37	4	7	<1
Sylvan	7-27	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
19F3----------	0-7	20-27	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37	5	6	1-2
Sylvan	7-27	18-27	1.30-1.50	0.6-2.0	0.20-0.22	6.6-8.4	Low----------	0.37			
26----------	0-8	20-25	1.35-1.55	0.2-0.6	0.22-0.24	6.1-8.4	Low----------	0.28	3	6	2-3
Wagner	8-16	18-25	1.35-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Low----------	0.28			
	16-60	35-47	1.35-1.55	<0.06	0.09-0.20	4.5-7.3	High---------	0.28			
30G----------	0-16	6-12	1.20-1.30	0.6-2.0	0.20-0.24	6.6-8.4	Low----------	0.43	5	4L	.5-2
Hamburg	16-60	6-12	1.20-1.30	0.6-2.0	0.17-0.22	7.4-8.4	Low----------	0.43			
43A, 43B-----	0-14	20-30	1.15-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Moderate-----	0.28	5	6	4-5
Ipava	14-54	35-43	1.25-1.50	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.43			
	54-60	20-27	1.30-1.55	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.43			
45----------	0-9	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	3	6	3-4
Denny	9-15	15-22	1.25-1.45	0.2-0.6	0.18-0.20	5.6-6.5	Low----------	0.37			
	15-47	35-45	1.20-1.40	0.06-0.2	0.11-0.22	5.6-6.5	High---------	0.37			
	47-60	25-35	1.40-1.60	0.2-0.6	0.20-0.22	5.6-7.8	Moderate-----	0.37			
46----------	0-18	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Moderate-----	0.28	5	6	3-4
Herrick	18-56	35-42	1.20-1.40	0.2-0.6	0.12-0.17	4.5-6.0	High---------	0.43			
	56-60	20-30	1.30-1.50	0.2-0.6	0.16-0.21	5.6-8.4	Moderate-----	0.43			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
50----------	0-14	25-30	1.20-1.40	0.6-2.0	0.21-0.24	5.6-7.8	Moderate-----	0.28	5	4	4-6
Virden	14-48	35-42	1.20-1.45	0.2-0.6	0.11-0.20	5.6-7.8	High---------	0.28			
	48-60	25-33	1.25-1.55	0.2-0.6	0.18-0.22	6.1-8.4	Moderate-----	0.28			
61----------	0-12	20-26	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
Atterberry	12-60	25-35	1.30-1.50	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.43			
70----------	0-11	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	11-47	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	47-60	15-30	1.35-1.55	0.2-0.6	0.18-0.22	5.6-7.8	Moderate-----	0.32			
71----------	0-20	35-45	1.20-1.40	<0.06	0.11-0.14	6.1-7.8	Very high----	0.28	3	4	4-5
Darwin	20-60	45-60	1.30-1.50	<0.06	0.11-0.14	6.1-7.8	Very high----	0.28			
119D----------	0-10	20-27	1.20-1.35	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	4	6	1-3
Elco	10-34	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.3	Moderate-----	0.37			
	34-60	25-45	1.40-1.60	0.2-0.6	0.14-0.20	5.1-7.3	Moderate-----	0.37			
119D3---------	0-6	25-33	1.20-1.35	0.6-2.0	0.18-0.21	5.6-7.3	Moderate-----	0.37	3	7	.5-1
Elco	6-25	23-35	1.25-1.45	0.6-2.0	0.18-0.21	5.1-7.3	Moderate-----	0.37			
	25-60	25-45	1.40-1.60	0.2-0.6	0.14-0.20	5.1-7.3	Moderate-----	0.37			
150----------	0-13	5-15	1.20-1.45	0.6-6.0	0.16-0.18	5.6-7.8	Low----------	0.24	4	3	2-4
Onarga	13-52	15-18	1.45-1.65	0.6-6.0	0.15-0.18	4.5-7.3	Low----------	0.32			
	52-60	5-10	1.50-1.75	6.0-20	0.08-0.10	5.1-7.3	Low----------	0.15			
242A----------	0-16	20-27	1.15-1.30	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Kendall	16-50	27-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
	50-60	10-25	1.55-1.70	0.6-2.0	0.11-0.22	5.6-8.4	Low----------	0.37			
257A, 257B----	0-12	20-27	1.25-1.50	0.6-2.0	0.22-0.24	5.1-6.0	Moderate-----	0.37	5	6	2-3
Clarksdale	12-51	35-42	1.30-1.50	0.2-0.6	0.11-0.20	5.1-7.3	High---------	0.37			
	51-60	20-30	1.40-1.60	0.2-0.6	0.20-0.22	6.1-8.4	Moderate-----	0.37			
264F, 264G----	0-3	10-25	1.30-1.50	0.6-2.0	0.13-0.22	4.5-7.3	Low----------	0.24	4	3	1-3
El Dara	3-14	5-20	1.35-1.55	0.6-2.0	0.10-0.18	4.5-7.3	Low----------	0.24			
	14-36	18-35	1.35-1.60	0.6-2.0	0.12-0.19	3.6-6.0	Low----------	0.32			
	36-60	5-25	1.50-1.80	0.6-2.0	0.11-0.19	4.5-6.0	Low----------	0.24			
274F, 274G----	0-7	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-3
Seaton	7-43	18-27	1.15-1.30	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37			
	43-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low----------	0.37			
278----------	0-14	20-27	1.25-1.45	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Stronghurst	14-53	27-35	1.30-1.55	0.6-2.0	0.18-0.20	5.1-6.5	Moderate-----	0.37			
	53-60	20-27	1.35-1.60	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
279A, 279B, 279C2----------	0-9	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.1-7.3	Low----------	0.37	5	6	1-3
Rozetta	9-60	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
279C3----------	0-7	27-35	1.30-1.50	0.6-2.0	0.20-0.22	5.1-7.3	Moderate-----	0.37	4	7	.5-1
Rozetta	7-42	27-35	1.35-1.55	0.6-2.0	0.18-0.20	5.1-6.0	Moderate-----	0.37			
	42-60	20-27	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
280B, 280C2----	0-12	15-25	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	6	1-2
Fayette	12-60	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.37			
280C3----------	0-6	25-32	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37	4	7	0-.5
Fayette	6-42	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	42-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.37			

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
280D2----------	0-12	15-25	1.30-1.35	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37	5	6	1-2
Fayette	12-60	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
280D3----------	0-6	25-32	1.35-1.45	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37	4	7	0-.5
Fayette	6-42	25-35	1.30-1.45	0.6-2.0	0.18-0.20	4.5-6.0	Moderate-----	0.37			
	42-60	22-26	1.45-1.50	0.6-2.0	0.18-0.20	5.1-7.8	Moderate-----	0.37			
284----------	0-12	22-35	1.25-1.45	0.6-2.0	0.21-0.24	6.1-7.8	Moderate-----	0.32	5	7	2-3
Tice	12-49	22-35	1.30-1.50	0.6-2.0	0.18-0.20	5.6-7.8	Moderate-----	0.32			
	49-60	15-30	1.40-1.60	0.6-2.0	0.11-0.18	5.6-7.8	Moderate-----	0.32			
331A----------	0-8	10-18	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Haymond	8-46	10-18	1.30-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
	46-60	10-18	1.30-1.45	0.6-2.0	0.20-0.22	6.1-7.3	Low----------	0.37			
333----------	0-8	10-17	1.30-1.50	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Wakeland	8-60	10-17	1.30-1.50	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
336----------	0-9	10-17	1.30-1.45	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	5	1-3
Wilbur	9-60	10-17	1.30-1.45	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.37			
386B----------	0-9	18-24	1.25-1.30	0.6-2.0	0.21-0.23	5.1-7.3	Low----------	0.32	5	6	2-3
Downs	9-50	26-35	1.30-1.35	0.6-2.0	0.18-0.20	4.5-7.3	Moderate-----	0.43			
	50-60	22-26	1.35-1.45	0.6-2.0	0.18-0.20	5.6-7.3	Moderate-----	0.43			
404----------	0-18	35-45	1.30-1.50	0.06-0.2	0.11-0.22	6.1-7.8	High---------	0.32	4	4	5-6
Titus	18-60	35-45	1.30-1.50	0.06-0.2	0.11-0.22	6.1-7.8	High---------	0.32			
415----------	0-5	10-18	1.20-1.30	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	5	5	1-3
Orion	5-25	10-18	1.20-1.30	0.6-2.0	0.20-0.22	5.6-7.8	Low----------	0.37			
	25-60	10-30	1.25-1.45	0.6-2.0	0.18-0.22	5.6-7.8	Low----------	0.37			
428----------	0-15	15-27	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.32	5	6	2-3
Coffeen	15-42	10-18	1.40-1.60	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.32			
	42-60	5-15	1.50-1.70	0.6-6.0	0.11-0.19	5.6-7.3	Low----------	0.32			
430B----------	0-17	18-24	1.20-1.40	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.32	5	6	2-4
Raddle	17-60	18-24	1.20-1.40	0.6-2.0	0.20-0.22	5.6-7.3	Low----------	0.43			
470C----------	0-13	20-27	1.30-1.40	0.6-2.0	0.22-0.24	5.6-7.8	Low----------	0.37	4	6	3-5
Keller	13-30	27-35	1.35-1.50	0.6-2.0	0.18-0.20	5.1-7.3	Moderate-----	0.37			
	30-60	30-42	1.50-1.70	0.06-0.2	0.10-0.19	5.1-7.8	Moderate-----	0.37			
551F, 551G-------	0-6	27-34	1.30-1.40	0.2-0.6	0.14-0.16	5.1-7.3	Moderate-----	0.43	2	4	1-2
Gosport	6-30	40-60	1.50-1.60	<0.06	0.12-0.14	3.6-5.5	High---------	0.32			
	30-60	40-75	1.70-1.90	<0.06	0.08-0.10	5.1-6.0	High---------	----			
570B----------	0-16	8-20	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.37	5	5	1-2
Martinsville	16-41	20-33	1.40-1.60	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	41-60	15-25	1.40-1.60	0.6-2.0	0.12-0.17	5.1-6.5	Low----------	0.24			
570C2----------	0-9	8-20	1.30-1.45	0.6-2.0	0.20-0.24	5.1-7.3	Low----------	0.37	5	5	1-2
Martinsville	9-28	20-33	1.40-1.60	0.6-2.0	0.16-0.20	5.1-7.3	Moderate-----	0.37			
	28-40	15-25	1.40-1.60	0.6-2.0	0.12-0.17	5.1-6.5	Low----------	0.24			
	40-60	2-20	1.50-1.70	0.6-6.0	0.08-0.17	5.6-8.4	Low----------	0.24			
605D2----------	0-14	15-27	1.30-1.50	0.6-2.0	0.20-0.24	4.5-7.3	Low----------	0.43	4	6	1-3
Ursa	14-60	35-45	1.50-1.70	0.06-0.2	0.09-0.17	4.5-7.3	High---------	0.32			
800B.											
Psamments											

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
806F. Orthents											
864*, 865*. Pits											
937F*, 937G*:											
Seaton----------	0-7	15-22	1.10-1.20	0.6-2.0	0.22-0.24	5.6-7.3	Low----------	0.37	5	6	1-3
	7-43	18-27	1.15-1.30	0.6-2.0	0.20-0.22	5.1-7.3	Low----------	0.37			
	43-60	15-25	1.20-1.40	0.6-2.0	0.20-0.22	5.6-8.4	Low----------	0.37			
Hickory---------	0-7	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	6	1-2
	7-48	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.37			
	48-60	15-32	1.50-1.70	0.6-2.0	0.11-0.19	5.1-8.4	Low----------	0.37			
967F*:											
Hickory---------	0-10	19-25	1.30-1.50	0.6-2.0	0.20-0.22	4.5-7.3	Low----------	0.37	5	6	1-2
	10-60	27-35	1.45-1.65	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-----	0.37			
Gosport---------	0-6	18-27	1.30-1.40	0.2-0.6	0.18-0.20	5.1-6.5	Low----------	0.43	3	6	1-2
	6-39	40-60	1.50-1.60	<0.06	0.12-0.14	3.6-5.5	High---------	0.32			
	39-60	40-75	1.70-1.90	<0.06	0.08-0.10	5.1-6.0	High---------	----			
1404----------	0-12	35-45	1.30-1.50	0.06-0.2	0.11-0.22	6.1-7.8	High---------	0.32	4	4	5-6
Titus	12-60	35-45	1.30-1.50	0.06-0.2	0.11-0.22	6.1-7.8	High---------	0.32			
3070----------	0-11	27-35	1.25-1.45	0.2-0.6	0.21-0.23	5.6-7.8	Moderate-----	0.32	5	7	5-6
Beaucoup	11-60	27-35	1.30-1.50	0.2-0.6	0.18-0.20	5.6-7.8	Moderate-----	0.32			
4071----------	0-20	35-45	1.20-1.40	<0.06	0.11-0.14	6.1-7.8	Very high----	0.28	3	4	4-5
Darwin	20-60	45-60	1.30-1.50	<0.06	0.11-0.14	6.1-7.8	Very high----	0.28			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
6C2, 6C3--- Fishhook	D	None	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High	High	High.
7D2, 7D3--- Atlas	D	None	---	---	0-2.0	Perched	Apr-Jun	>60	---	High	High	Moderate.
8F, 8G--- Hickory	C	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
16--- Rushville	D	None	---	---	+1-1.0	Perched	Mar-Jun	>60	---	High	High	High.
17A, 17B--- Keomah	C	None	---	---	2.0-4.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
19C3, 19D3, 19F3--- Sylvan	B	None	---	---	>6.0	---	---	>60	---	High	Moderate	Moderate.
26--- Wagner	D	Occasional	Brief	Mar-May	0-2.0	Apparent	Mar-Jun	>60	---	Moderate	High	High.
30G--- Hamburg	B	None	---	---	>6.0	---	---	>60	---	High	Low	Low.
43A, 43B--- Ipava	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
45--- Denny	D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
46--- Herrick	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High	High.
50--- Virden	B/D	None	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
61--- Atterberry	B	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High	High	Moderate.
70--- Beaucoup	B/D	Rare	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High	High	Low.
71--- Darwin	D	Rare	---	---	+1-2.0	Apparent	Mar-Jun	>60	---	Moderate	High	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
119D, 119D3----- Elco	B	None--------	---	---	2.5-4.5	Perched	Mar-May	>60	---	High-----	High-----	Moderate.
150---------- Onarga	B	Rare--------	---	---	>6.0	---	---	>60	---	Moderate	Low------	High.
242A---------- Kendall	B	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
257A, 257B------ Clarksdale	C	None--------	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Moderate.
264F, 264G------ El Dara	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
274F, 274G------ Seaton	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Low------	Moderate.
278---------- Stronghurst	B	None--------	---	---	1.0-3.0	Apparent	Apr-Jun	>60	---	High-----	High-----	Moderate.
279A, 279B, 279C2, 279C3--- Rozetta	B	None--------	---	---	4.0-6.0	Apparent	Mar-Jun	>60	---	High-----	Moderate	Moderate.
280B, 280C2, 280C3, 280D2, 280D3---------- Fayette	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
284---------- Tice	B	Frequent----	Brief-----	Mar-May	1.5-3.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
331A---------- Haymond	B	Frequent----	Brief-----	Mar-May	>6.0	---	---	>60	---	High-----	Low------	Low.
333---------- Wakeland	C	Frequent----	Brief-----	Jan-May	1.0-3.0	Apparent	Mar-Apr	>60	---	High-----	High-----	Low.
336---------- Wilbur	B	Rare--------	---	---	1.5-3.0	Apparent	Mar-Apr	>60	---	High-----	Moderate	Moderate.
386B---------- Downs	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
404---------- Titus	B/D	Rare--------	---	---	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
415---------- Orion	C	Rare--------	---	---	1.0-3.0	Apparent	Mar-May	>60	---	High-----	High-----	Low.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action	Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness		Uncoated steel	Concrete
					Ft			In				
428---------- Coffeen	B	Rare--------	---	---	1.0-3.0	Apparent	Mar-May	>60	---	High-----	High-----	Moderate.
430B---------- Raddle	B	Rare--------	---	---	>6.0	---	---	>60	---	High-----	Moderate	Moderate.
470C---------- Keller	C	None--------	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High-----	High-----	Moderate.
551F, 551G------ Gosport	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	High.
570B, 570C2----- Martinsville	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
605D2---------- Ursa	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	High-----	Moderate.
800B. Psamments												
806F. Orthents												
864*, 865*. Pits												
937F*, 937G*:												
Seaton---------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Low------	Moderate.
Hickory--------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
967F*:												
Hickory--------	C	None--------	---	---	>6.0	---	---	>60	---	Moderate	Moderate	Moderate.
Gosport--------	C	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	High-----	High.
1404---------- Titus	B/D	Frequent----	Brief-----	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
3070---------- Beaucoup	B/D	Frequent----	Brief-----	Mar-Jun	+.5-2.0	Apparent	Mar-Jun	>60	---	High-----	High-----	Low.
4071---------- Darwin	D	Frequent----	Long------	Jan-Jun	+1-2.0	Apparent	Jan-Jun	>60	---	Moderate	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX TEST DATA

(Dashes indicate that data were not available. MAX means maximum dry density; OPT, optimum moisture; LL, liquid limit; PI, plasticity index; UN, Unified; and NP, nonplastic)

Soil name and location	Sample number	Horizon	Depth	Moisture density		Percentage passing sieve--				LL	PI	Classification	
				MAX	OPT	No. 4	No. 10	No. 40	No. 200			AASHTO	UN
			In	Lb/ft^3	Pct					Pct			
Atlas silt loam:	74-IL-009-4-1	Ap	0-7	106	16	100	100	98	91	29	5	A-4	CL-ML
995 feet east and	74-IL-009-4-4	2Btg2	17-28	102	20	100	100	96	84	50	30	A-7	CH
335 feet south of	74-IL-009-4-7	2Btg5	51-60	111	17	100	99	97	83	47	30	A-7	CL
the northwest corner of sec. 18, T. 1 S., R. 4 W.													
Darwin silty clay:	81-IL-009-12-1	Ap	0-9	95	23	100	100	98	87	46	22	A-7	CL
1,800 feet east and	81-IL-009-12-4	Bg2	26-31	104	21	100	99	96	81	42	23	A-7	CL
220 feet north of the southwest corner of sec. 34, T. 2 S., R. 2 W.													
Downs silt loam:	81-IL-009-50-1	Ap	0-9	109	16	100	100	99	92	25	3	A-4	ML
800 feet north and	81-IL-009-50-3	Bt2	17-27	104	21	---	100	100	100	39	19	A-6	CL
460 feet west of the	81-IL-009-50-6	Bt5	50-60	108	18	---	100	100	100	32	11	A-6	CL
center of sec. 25, T. 1 S., R. 2 W.													
Fayette silt loam:	74-IL-009-3-1	Ap	0-8	105	16	100	100	99	97	29	4	A-4	ML
805 feet east and	74-IL-009-3-6	Bt3	25-36	103	21	---	100	100	100	43	21	A-7	CL
1,215 feet north of	74-IL-009-3-8	Bt5	48-60	106	19	---	100	100	100	40	20	A-6	CL
the center of sec. 36, T. 2 S., R. 3 W.													
Keller silt loam:	74-IL-009-6-1	Ap	0-8	93	25	100	100	99	96	46	15	A-7	ML
2,460 feet north and	74-IL-009-6-5	Bt2	23-30	123	23	100	100	99	97	43	22	A-7	CL
980 feet east of the	74-IL-009-6-6	2Btg1	30-41	104	20	---	100	99	95	43	25	A-7	CL
southwest corner of sec. 9, T. 1 S., R. 4 W.													
Keomah silt loam:	74-IL-009-1-1, 74-IL-009-1-2	Ap, E	0-9	105	17	---	100	94	92	27	2	A-4	ML
180 feet north and													
2,185 feet west of	74-IL-009-1-5	Btg1	20-32	100	21	---	100	100	99	55	33	A-7	CH
the southeast corner	74-IL-009-1-8	Cg	56-60	110	17	---	100	100	99	33	10	A-6	CL
of sec. 10, T. 2 S., R. 4 W.													
Rushville silt loam:	74-IL-009-5-2	E	8-13	108	17	---	100	97	96	26	3	A-4	ML
1,625 feet west and	74-IL-009-5-4	Btg2	16-25	94	24	---	100	100	99	59	35	A-7	CH
2,000 feet south of	74-IL-009-5-7	BCg	46-58	104	20	---	100	99	99	42	21	A-7	CL
the northeast corner of sec. 3, T. 2 S., R. 4 W.													
Titus silty clay loam:	80-IL-009-17-1	Ap	0-8	103	20	100	100	99	91	38	18	A-6	CL
1,100 feet south	80-IL-009-17-5	Bg3	32-45	107	19	100	99	99	97	41	23	A-7	CL
and 1,280 feet east of the northwest corner of sec. 34, T. 2 S., R. 2 W.													

TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Atlas	Fine, montmorillonitic, mesic, sloping Aeric Ochraqualfs
Atterberry	Fine-silty, mixed, mesic Udollic Ochraqualfs
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Clarksdale	Fine, montmorillonitic, mesic Udollic Ochraqualfs
Coffeen	Coarse-silty, mixed, mesic Fluvaquentic Hapludolls
Darwin	Fine, montmorillonitic, mesic Vertic Haplaquolls
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs
El Dara	Fine-loamy, mixed, mesic Typic Hapludalfs
Elco	Fine-silty, mixed, mesic Typic Hapludalfs
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs
Fishhook	Fine-silty, mixed, mesic Aquic Hapludalfs
Gosport	Fine, illitic, mesic Typic Dystrochrepts
Hamburg	Coarse-silty, mixed (calcareous), mesic Typic Udorthents
Haymond	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Herrick	Fine, montmorillonitic, mesic Aquic Argiudolls
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls
Keller	Fine-silty, mixed, mesic Aquic Argiudolls
Kendall	Fine-silty, mixed, mesic Aeric Ochraqualfs
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Martinsville	Fine-loamy, mixed, mesic Typic Hapludalfs
*Onarga	Coarse-loamy, mixed, mesic Typic Argiudolls
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents
Orthents	Clayey-skeletal, mesic Udorthents
Psamments	Mesic Udipsamments
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs
Rushville	Fine, montmorillonitic, mesic Typic Albaqualfs
Seaton	Fine-silty, mixed, mesic Typic Hapludalfs
Stronghurst	Fine-silty, mixed, mesic Aeric Ochraqualfs
Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs
Tice	Fine-silty, mixed, mesic Fluvaquentic Hapludolls
Titus	Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls
Ursa	Fine, montmorillonitic, mesic Typic Hapludalfs
Virden	Fine, montmorillonitic, mesic Typic Argiaquolls
*Wagner	Fine, montmorillonitic, mesic Mollic Albaqualfs
Wakeland	Coarse-silty, mixed, nonacid, mesic Aeric Fluvaquents
Wilbur	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents

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Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

LEGEND

1 — IPAVA-VIRDEN association: Nearly level and gently sloping, somewhat poorly drained and poorly drained soils formed in loess; on uplands

2 — KEOMAH-ROZETTA association: Nearly level to sloping, somewhat poorly drained and moderately well drained soils formed in loess; on uplands

3 — FAYETTE-SEATON-HICKORY association: Gently sloping to steep, well drained soils formed in loess or loess and glacial till; on uplands

4 — FAYETTE-SYLVAN association: Gently sloping to strongly sloping, well drained soils formed in loess; on uplands

5 — HICKORY-ROZETTA-GOSPORT association: Nearly level to steep, well drained and moderately well drained soils formed in loess and glacial till, loess, or shale residuum; on uplands

6 — HAYMOND-WAKELAND association: Nearly level, well drained and somewhat poorly drained soils formed in medium textured alluvium; on flood plains

7 — DARWIN-TITUS-BEAUCOUP association: Nearly level, poorly drained and very poorly drained soils formed in fine textured and moderately fine textured alluvium; on flood plains

COMPILED 1985

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
ILLINOIS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

BROWN COUNTY
ILLINOIS

Scale 1:126,720

1 0 1 2 3 4 Miles

1 0 3 6 Km

R 4 W
R 3 W
SCHUYLER COUNTY
40°05′
COUNTY
ADAMS
39°55′
90°50′
PIKE COUNTY
90°40′
R 2 W
R 1 W
T 1 N
T 1 S
T 2 S
N
Damon
PEARIDGE
MISSOURI
SCHUYLER
RIPLEY
Ripley
Mound Station (Timewell)
Lake Mt. Sterling
Mount Sterling
LEE
Fargo
MOUNT STERLING
COOPERSTOWN
Cooperstown
COUNTY
Big Lake
Hersman
La Grange
Buckhorn
BUCKHORN
ELKHORN
VERSAILLES
Versailles
Morrelville
MORGAN COUNTY
Missouri
Creek
La Moine
North Fork
South Fork
Little Missouri
Branch
Lake Mt. Sterling
West Branch
Hamilton
Logan
Illinois River
Dry Fork
Purpus Creek
Camp Creek
Avery Branch
Russett Br
Martin Branch
Leineke Creek
Big Lake
Boggs Branch
CASS COUNTY

SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Inset, sheet 4
Inset, A sheet 35
Inset, B sheet 35

INDEX TO MAP SHEETS
BROWN COUNTY
ILLINOIS

Scale 1:126,720

1 0 1 2 3 4 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols consist of numbers or a combination of numbers and a letter. The initial numbers represent the kind of soil. A capital letter following these numbers indicates the class of slope. Symbols without a slope letter are for nearly level soils or miscellaneous areas. A final number of 2 following the slope letter indicates that the soil is eroded and 3 that it is severely eroded.

SYMBOL	NAME
6C2	Fishhook silt loam, 5 to 10 percent slopes, eroded
6C3	Fishhook silty clay loam, 5 to 10 percent slopes, severely eroded
7D2	Atlas silt loam, 10 to 15 percent slopes, eroded
7D3	Atlas clay loam, 10 to 15 percent slopes, severely eroded
8F	Hickory loam, 15 to 30 percent slopes
8G	Hickory loam, 30 to 50 percent slopes
16	Rushville silt loam
17A	Keomah silt loam, 0 to 2 percent slopes
17B	Keomah silt loam, 2 to 5 percent slopes
19C3	Sylvan silty clay loam, 5 to 10 percent slopes, severely eroded
19D3	Sylvan silty clay loam, 10 to 15 percent slopes, severely eroded
19F3	Sylvan silt loam, 15 to 30 percent slopes, severely eroded
26	Wagner silt loam
30G	Hamburg silt, 25 to 50 percent slopes
43A	Ipava silt loam, 0 to 2 percent slopes
43B	Ipava silt loam, 2 to 5 percent slopes
45	Denny silt loam
46	Herrick silt loam
50	Virden silty clay loam
61	Atterberry silt loam
70	Beaucoup silty clay loam
71	Darwin silty clay
119D	Elco silt loam, 10 to 15 percent slopes
119D3	Elco silty clay loam, 10 to 15 percent slopes, severely eroded
150	Onarga loam, rarely flooded
242A	Kendall silt loam, 0 to 3 percent slopes
257A	Clarksdale silt loam, 0 to 2 percent slopes
257B	Clarksdale silt loam, 2 to 5 percent slopes
264F	El Dara fine sandy loam, 15 to 30 percent slopes
264G	El Dara fine sandy loam, 30 to 50 percent slopes
274F	Seaton silt loam, 15 to 30 percent slopes
274G	Seaton silt loam, 30 to 50 percent slopes
278	Stronghurst silt loam
279A	Rozetta silt loam, 0 to 2 percent slopes
279B	Rozetta silt loam, 2 to 5 percent slopes
279C2	Rozetta silt loam, 5 to 10 percent slopes, eroded
279C3	Rozetta silty clay loam, 5 to 10 percent slopes, severely eroded
280B	Fayette silt loam, 2 to 5 percent slopes
280C2	Fayette silt loam, 5 to 10 percent slopes, eroded
280C3	Fayette silty clay loam, 5 to 10 percent slopes, severely eroded
280D2	Fayette silt loam, 10 to 15 percent slopes, eroded
280D3	Fayette silty clay loam, 10 to 15 percent slopes, severely eroded
284	Tice silt loam
331A	Haymond silt loam, 0 to 3 percent slopes
333	Wakeland silt loam
336	Wilbur silt loam
386B	Downs silt loam, 2 to 5 percent slopes
404	Titus silty clay loam
415	Orion silt loam
428	Coffeen silt loam
430B	Raddle silt loam, 1 to 5 percent slopes
470C	Keller silt loam, 5 to 10 percent slopes
551F	Gosport silty clay loam, 15 to 30 percent slopes
551G	Gosport silty clay loam, 30 to 50 percent slopes
570B	Martinsville loam, 2 to 5 percent slopes
570C2	Martinsville loam, 5 to 10 percent slopes, eroded
605D2	Ursa loam, 10 to 15 percent slopes, eroded
800B	Psamments, gently sloping
806F	Orthents, clayey-skeletal, hilly
864	Pits, quarries
865	Pits, gravel
937F	Seaton-Hickory complex, 15 to 30 percent slopes
937G	Seaton-Hickory silt loams, 30 to 50 percent slopes
967F	Hickory-Gosport complex, 15 to 30 percent slopes
1404	Titus silty clay loam, wet
3070	Beaucoup silty clay loam, frequently flooded
4071	Darwin silty clay, ponded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- County or parish
- Reservation (national forest or park, state forest or park)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery — Davis Airstrip

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Other roads

ROAD EMBLEMS & DESIGNATIONS

- Federal — 410
- State — 52

LEVEES

- Without road

DAMS

- Large (to scale)
- Medium or small — water

PITS

- Gravel pit
- Mine or quarry

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

Canals or ditches

- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 17A / 279B

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

DEPRESSION OR SINK

SOIL SAMPLE SITE

MISCELLANEOUS

- Gravelly spot
- Rock outcrop (includes sandstone and shale)
- Sandy spot
- Severely eroded spot

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 1

N

1 MILE

1 KILOMETER

Scale 1:15 840

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 2

(2)

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0.5 1/4 1/2 3/4 1

R. 4 W. | R. 3 W.

325 000 FEET

250 000 FEET

315 000 FEET

245 000 FEET

T. 1 S.

T. 1 N.

SCHUYLER COUNTY

Missouri

Little Missouri

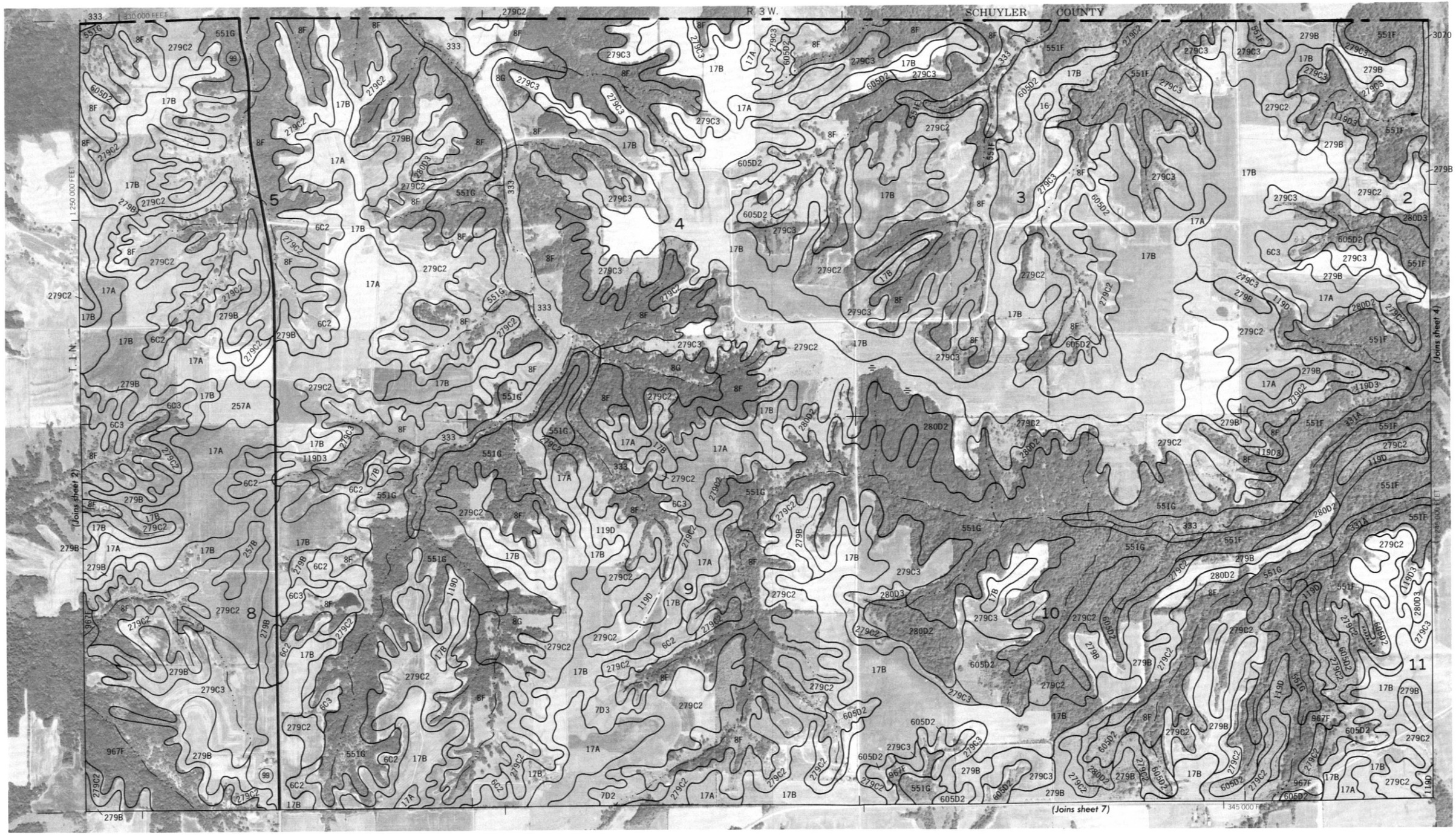
Creek

(Joins sheet 1)

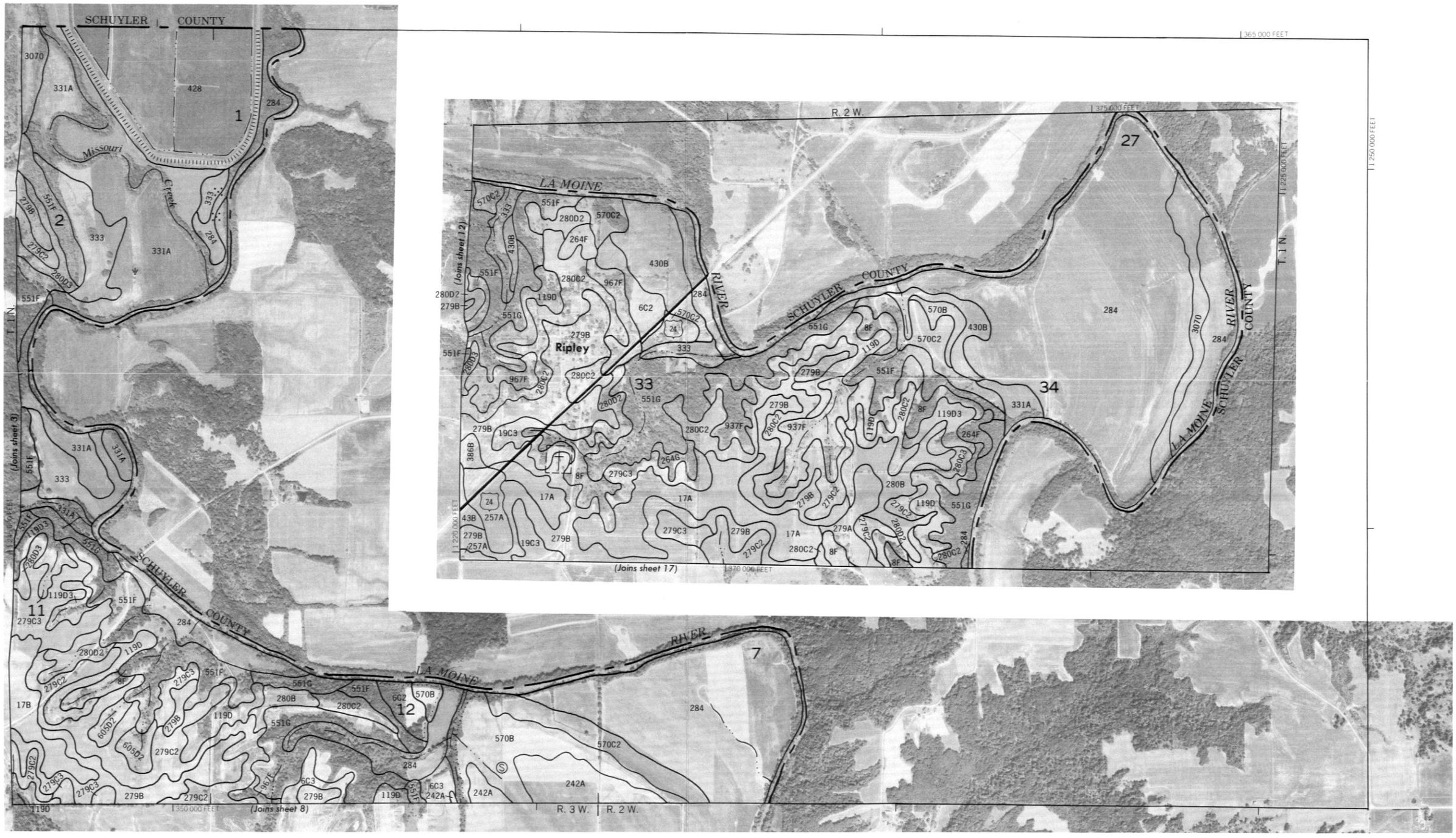
(Joins sheet 3)

(Joins sheet 6)

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners shown are approximately positioned



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners, if shown, are approximately positioned

5

N

T 1 N.

R. 4 W.

240 000 FEET

295 000 FEET

ADAMS COUNTY

BROWN COUNTY

Little Missouri Creek

(Joins sheet 1)

(Joins sheet 6)

(Joins sheet 9)

1 MILE

1 KILOMETER

Scale 1:15 840

N

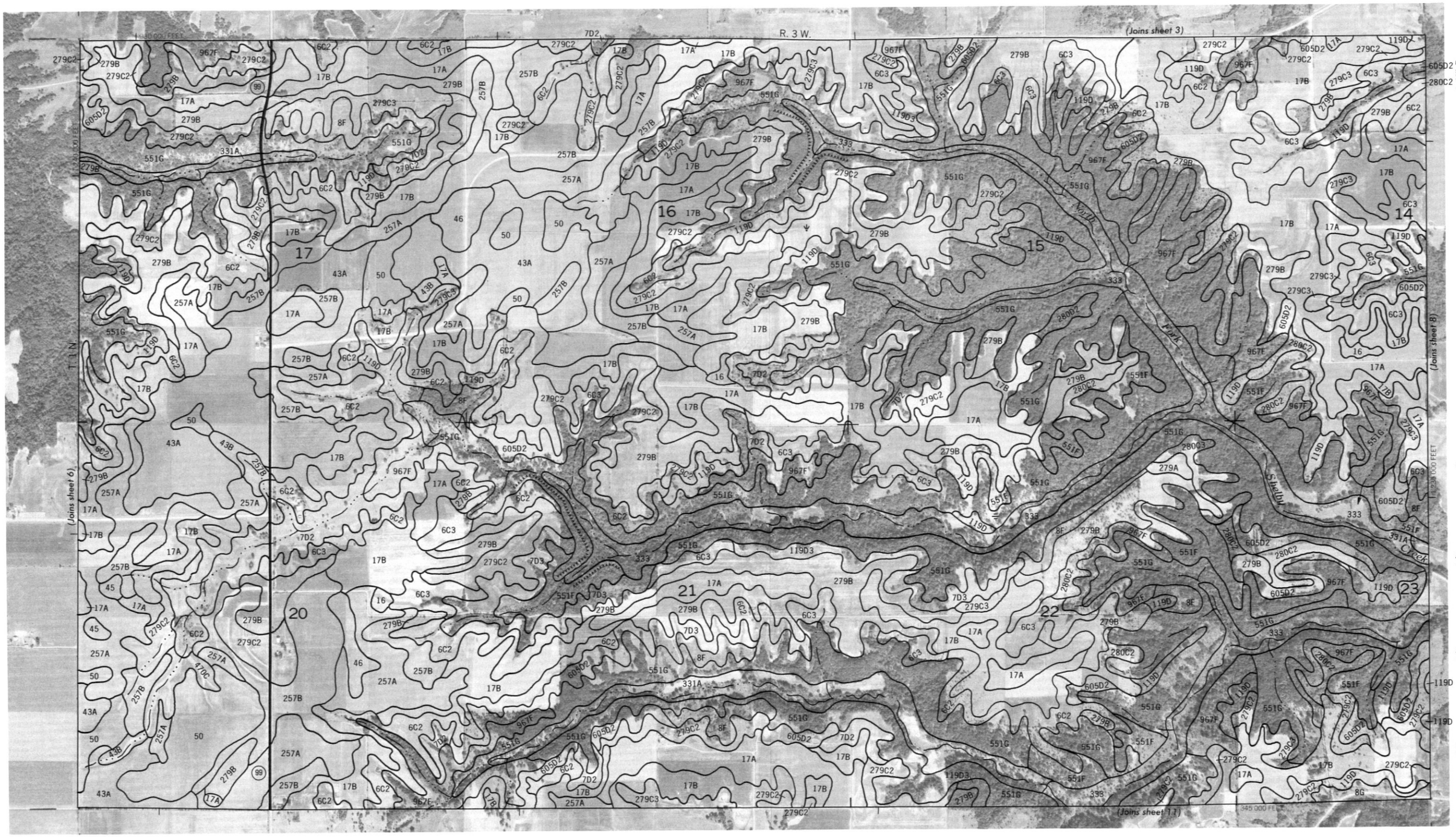
Scale 1:15 840

1 MILE 0 1/4 0.5 1/2 1 3/4 1

1 KILOMETER 0 1

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown are approximately positioned

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 7



7

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0 1/4 0.5 1/2 3/4 1

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0.5 1/4 1/2 3/4

(Joins sheet 4)

(Joins sheet 7)

(Joins sheet 12)

R. 3 W. | R. 2 W.

T 1 N.

1 365 000 FEET

1 240 000 FEET

1 250 000 FEET

SCHUYLER COUNTY

SCHUYLER RIVER

LA MOINE RIVER

North Fork Shelby Creek

South Fork Shelby Creek

13 14 18 23 24 19

119D 279B 279C2 279C3 6C3 605D2 280C2 551G 551F 570B 242A 284 570C2 3070 967F 17A 17B 6C2 7D2 333 119D3 280C3 7D3 331A 8F 264F 264G 280B 280C2 8G

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture Soil Conservation Service and cooperating agencies
Coordinate grid ticks and land division corners if shown are approximately positioned

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 9

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

9

N

1 MILE

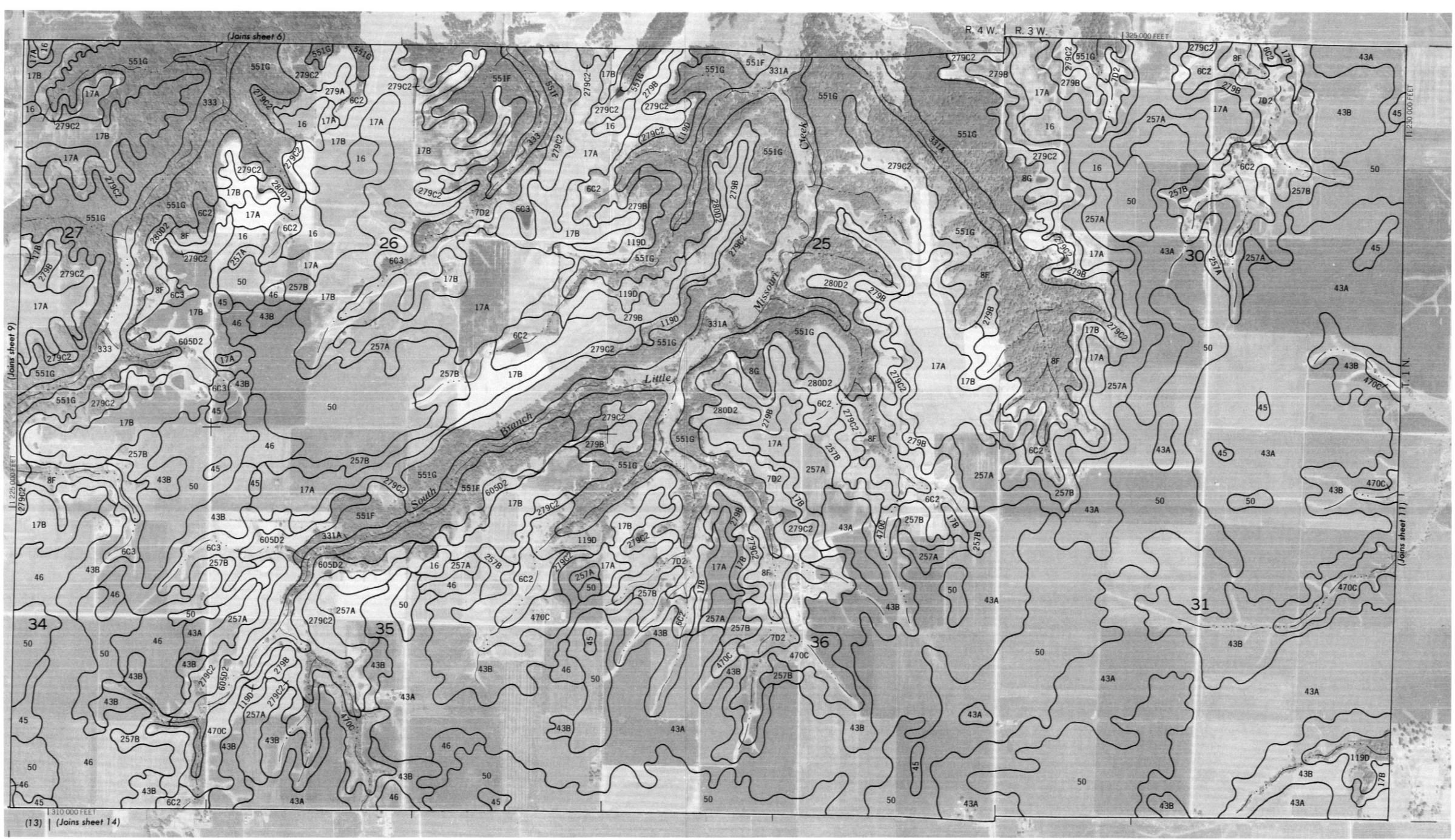
1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 10



10

N

1 MILE

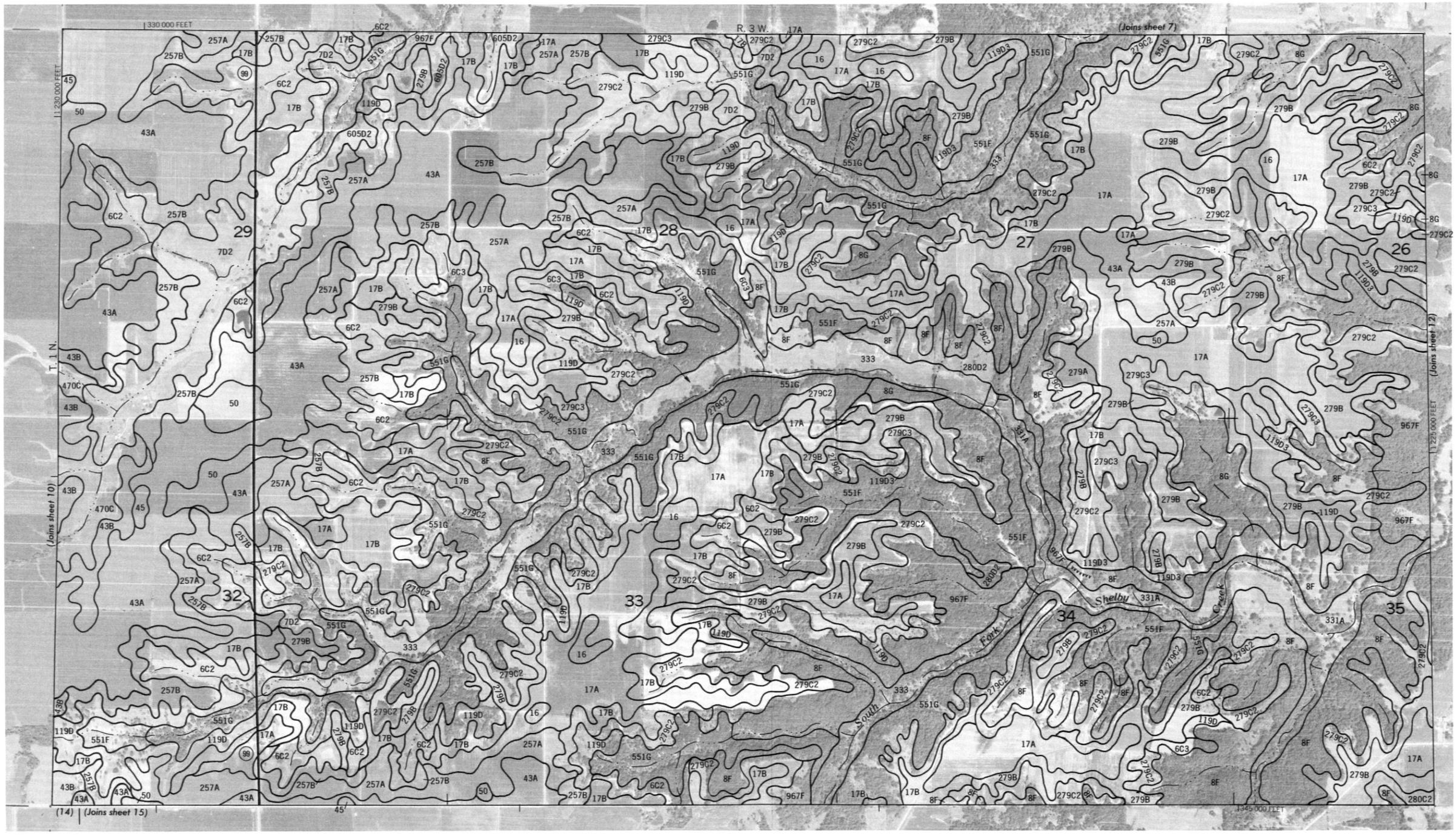
1 KILOMETER

Scale 1:15 840

0 1/4 0.5 1/2 3/4 1

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 11



11

N

MILE

KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 12

12

N

1 MILE

1 KILOMETER

Scale 1:15 840

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 13

13

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1
0 0.5

14

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0.5 1

1/4 1/2 3/4 1

1 215 000 FEET

310 000 FEET

R. 4 W. | R. 3 W.

225 000 FEET

1 220 000 FEET

T. 1 S.

(Joins sheet 13)

(Joins sheet 10) (11)

(Joins sheet 19)

(Joins sheet 15)

West Creek

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 15

15

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0 1/4 0.5 1/2 1 3/4

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

330 000 FEET

1 220 000 FEET

1 210 000 FEET

345 000 FEET

R. 3 W.

T 1 S.

(Joins sheet 11)

(Joins sheet 14)

(Joins sheet 16)

(Joins sheet 20)

Lake Mt. Sterling

South Fork Shelby Creek

West Creek

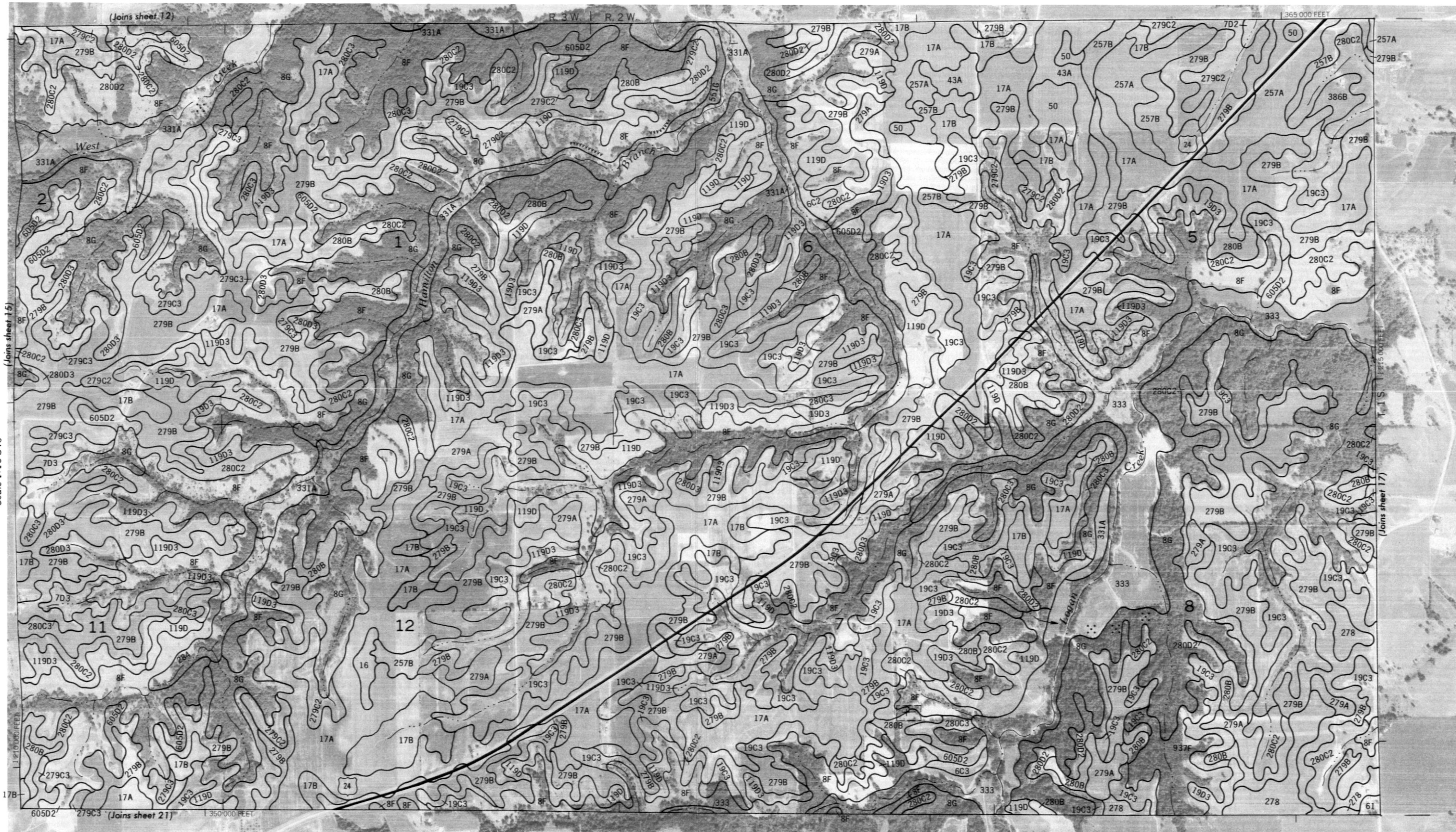
MT. STERLING (county seat)

CEMETERY

water

5 4 3 2 8 9 10 11

N



1 MILE
1 KILOMETER
Scale 1:15 840

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

18

N

(Joins sheet 13)

R. 4 W.

305 000 FEET

4 410 000 FEET

T 1 S

ADAMS COUNTY

Fargo

Creek

Fork

Wells

Pur pus

(Joins sheet 19)

(Joins sheet 24)

295 000 FEET

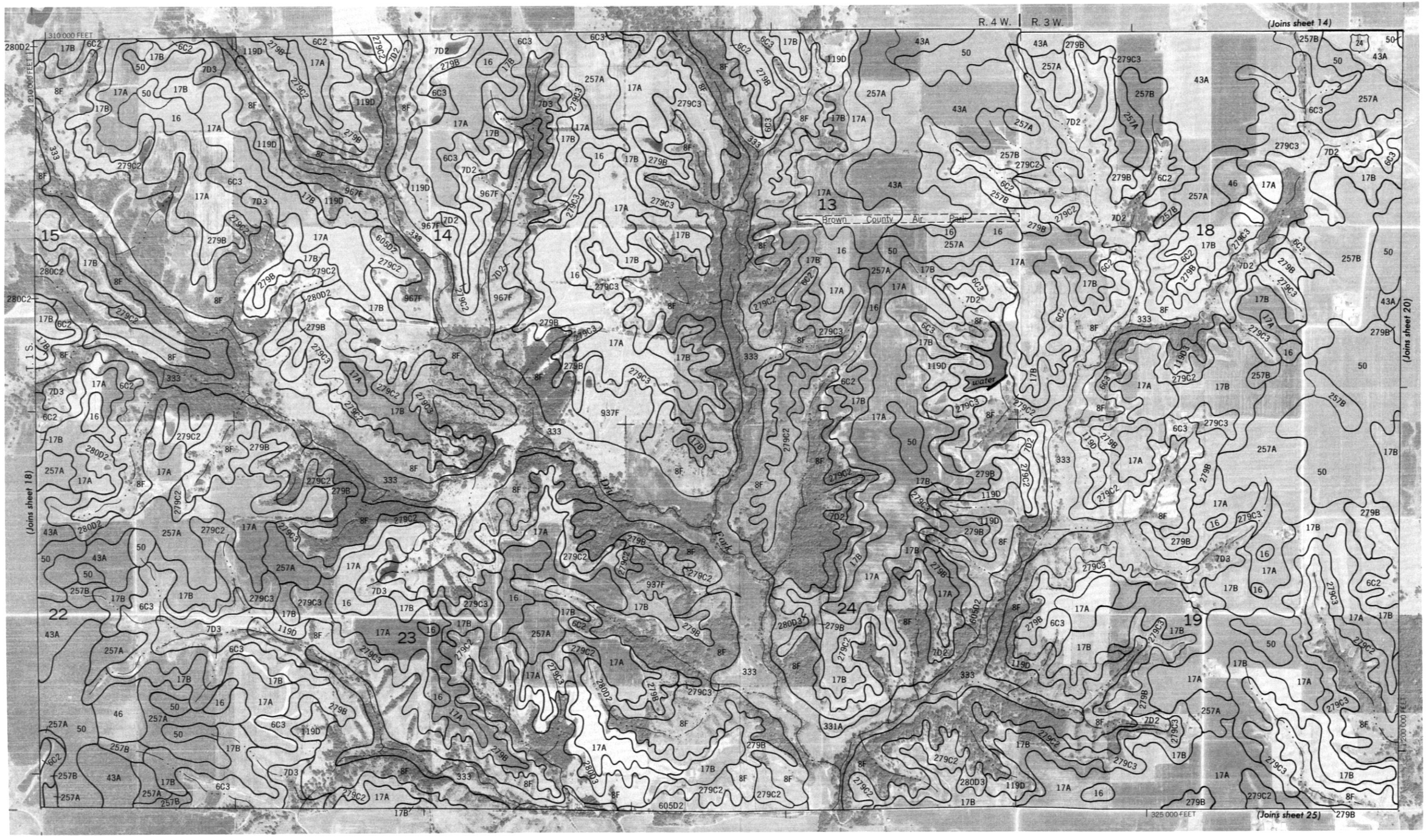
1 400 000 FEET

Scale 1:15 840

1 MILE

1 KILOMETER

0 1/4 0.5 1/2 3/4 1



19

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 0.5 1/2 3/4

20

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0 1/4 0.5 1/2 3/4 1

R. 3 W.

(Joins sheet 15)

(Joins sheet 19)

(Joins sheet 26)

(Joins sheet 21)

345 000 FEET

330 000 FEET

11 000 000 FEET

T. 1 S.

MT. STERLING
(county seat)

17 16 15 14 20 21 22 23

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 21

21

N

R. 3 W. | R. 2 W.

T. 1 S.

350 000 FEET

1 205 000 FEET

365 000 FEET

(Joins sheet 16)

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 27)

Logan Creek

MILE

KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 22

N

MILE

KILOMETER

Scale 1:15 840

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SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 23

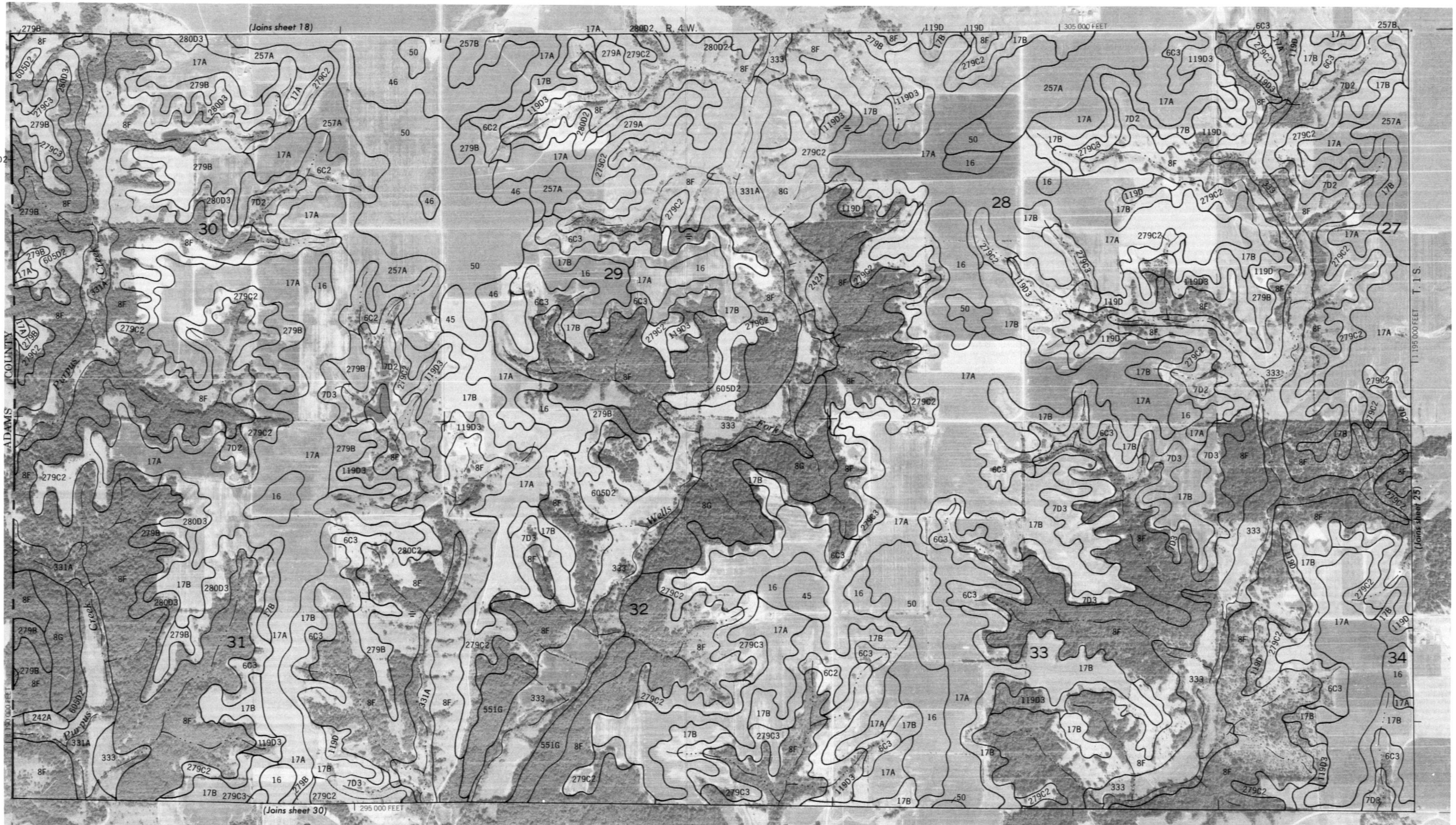
SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 24

N

1 MILE

1 KILOMETER

Scale 1:15 840



This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 25

25

N

R. 4 W. R. 3 W. (Joins sheet 19)

T. 1 S.

310 000 FEET

1 195 000 FEET

(Joins sheet 24)

(Joins sheet 26)

(Joins sheet 31)

325 000 FEET

Buckhorn

Drn

Fork

1 MILE

1 KILOMETER

Scale 1:15 840

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture. Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

26

N

Scale 1:15 840

1 MILE

1 KILOMETER

0 0.5 1

1/4 1/2 3/4

(Joins sheet 20)

(Joins sheet 25)

(Joins sheet 27)

(Joins sheet 32)

R. 3 W.

T. 1 S.

345 000 FEET

330 000 FEET

1 195 000 FEET

1 190 000 FEET

Logan Creek

Camp Cr

Hersman

Arrow Branch

26

27

28

29

32

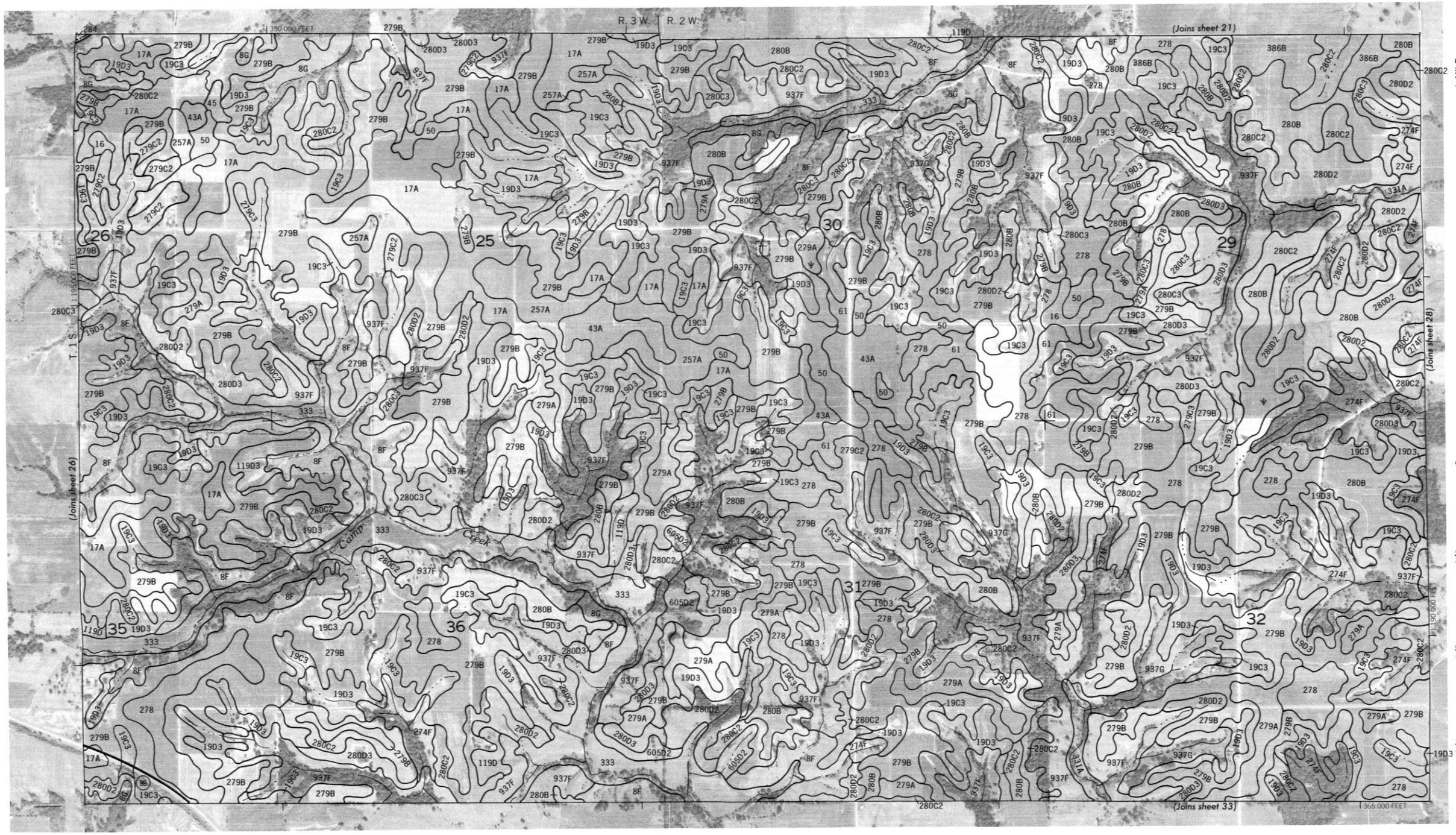
33

34

35

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 27



27

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0 1/4 0.5 1/2 1 3/4

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 28

28

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0.5 0 1/4 1/2 3/4 1

(Joins sheet 22)

(Joins sheet 27)

(Joins sheet 34)

(Joins sheet 29)

R. 2 W.

T. 1 S.

380 000 FEET

370 000 FEET

190 000 FEET

195 000 FEET

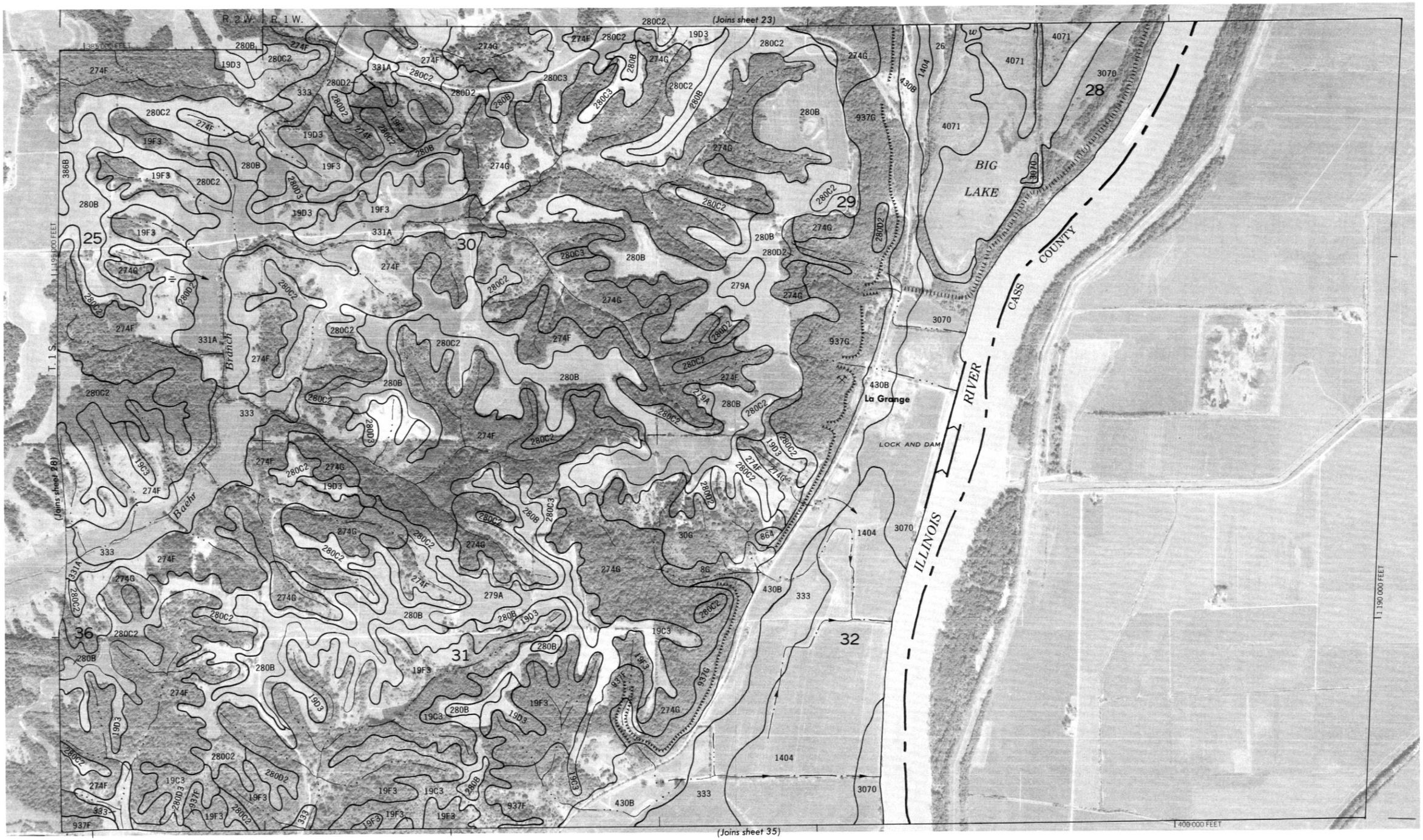
Little Creek

Little Creek Branch

Bachr Creek

27 28 26 25 33 34 35 36

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 29



30

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0.5 1

1/4 1/2 3/4

ADAMS COUNTY

(Joins sheet 24)

(Joins sheet 36)

(Joins sheet 31)

R. 4 W.

T. 2 S.

305 000 FEET

4 680 000 FEET

Purpus Creek

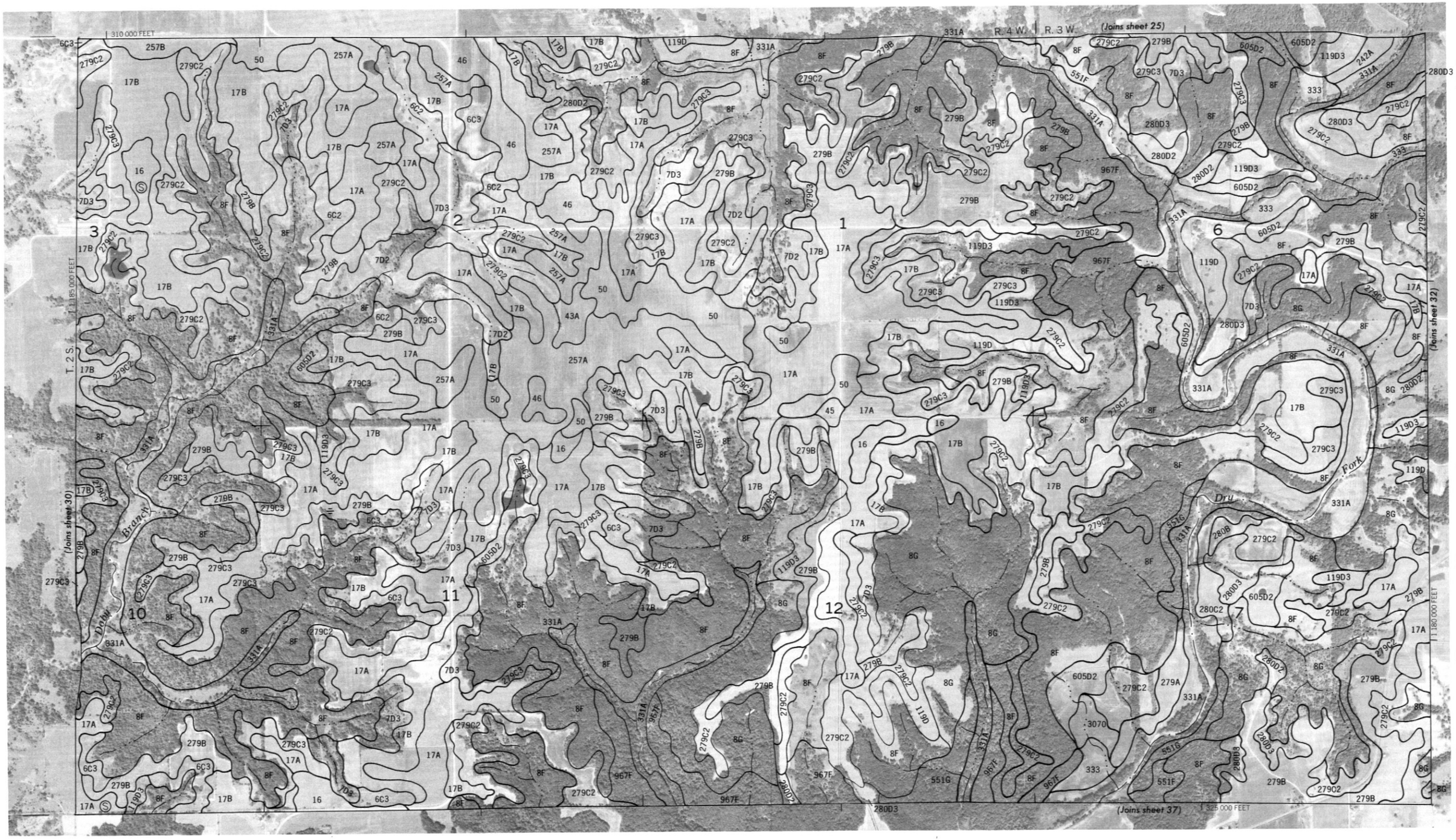
Wells Creek

Missouri Creek

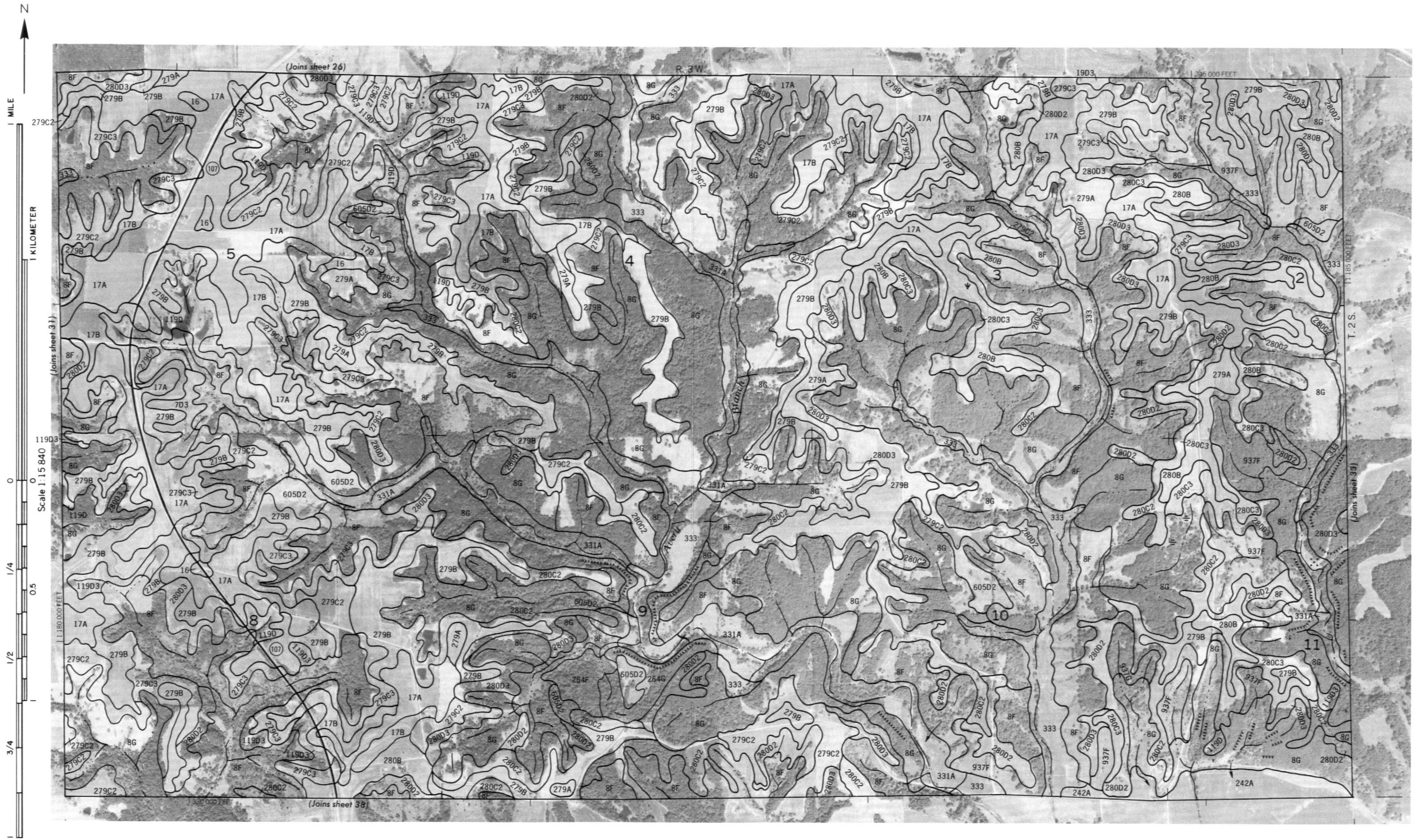
Bryant Ditch

Dotty Ditch

6 5 4 3 7 8 9 10



SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 32



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Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 33

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

33

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1
0 0.5

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 0.5 0

1/4 1/2 3/4 1

(Joins sheet 28)

(Joins sheet 33)

(Joins sheet 40)

(Joins sheet 35)

R. 2 W.

T. 2 S.

380 000 FEET

185 000 FEET

180 000 FEET

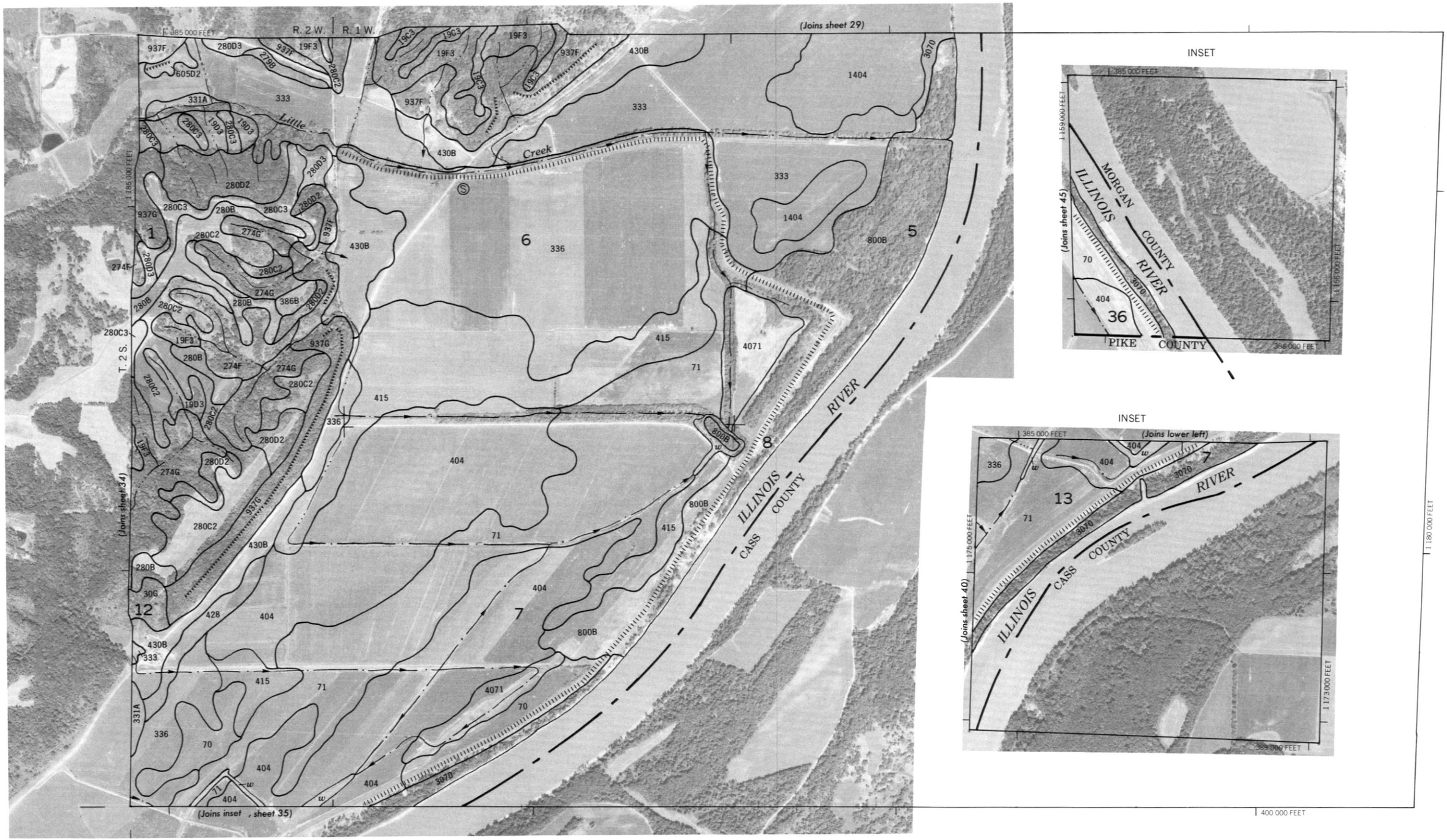
370 000 FEET

Camp Creek

Camp Creek

Little Creek

331A Creek



35

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

N

Scale 1:15 840

1 MILE

1 KILOMETER

0 0.5 1/4 1/2 3/4

1 170 000 FEET

290 000 FEET

305 000 FEET

T. 2 S.

R. 4 W.

(Joins sheet 30)

(Joins sheet 41)

(Joins sheet 37)

ADAMS COUNTY

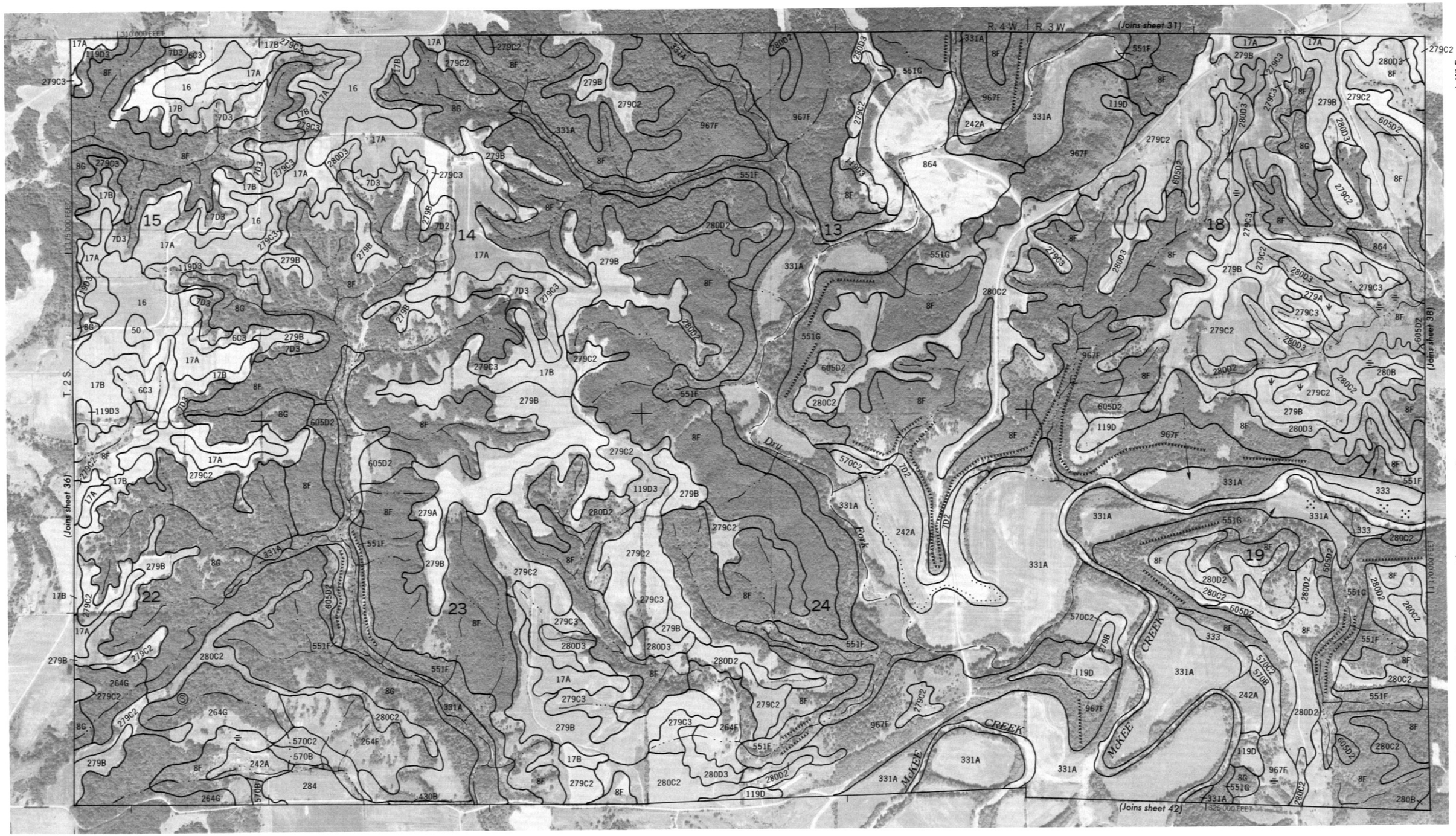
SILOAM SPRINGS STATE PARK

Little Missouri Creek

McKee Creek

Dalbu Branch

water



37

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1
0 0.5 1

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 38

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 39

39

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

R. 3 W. | R. 2 W.

T. 2 S.

350 000 FEET

175 000 FEET

170 000 FEET

165 000 FEET

(Joins sheet 33)

(Joins sheet 38)

(Joins sheet 40)

(Joins sheet 44)

Versailles

McKEE CREEK

Russell Branch

water

13 14 17 18 19 20 23 24 45 61 99

40

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 0.5 1/2 3/4 1

1 70000 FEET

(Joins sheet 34)

(Joins sheet 39)

(Joins sheet 45)

(Joins inset, sheet 33)

R. 2 W.

T. 2 S.

1 380 000 FEET

1 375 000 FEET

Camp Creek

CASS COUNTY

ILLINOIS RIVER

MORGAN COUNTY

16 15 14 13 21 22 23 24

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.


(Joins sheet 36)
(Joins sheet 42)
R. 4 W.
T. 2 S.
ADAMS COUNTY
PIKE COUNTY
McKEE CREEK
Benville
27
28
29
30
31
32
33
34
290 000 FEET
165 000 FEET
160 000 FEET
305 000 FEET
N
1 MILE
1 KILOMETER
Scale 1:15 840
0
1/4
1/2
3/4
0.5
This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
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SOIL MAP OF BROWN COUNTY, ILLINOIS — SHEET NUMBER 42

This soil survey map is compiled on 1979 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

R. 3 W.

T. 2 S.

330 000 FEET

165 000 FEET

1 160 000 FEET

345 000 FEET

(Joins sheet 38)

(Joins sheet 42)

(Joins sheet 44)

PIKE COUNTY

McKEE CREEK

29 28 27 26 32 33 34 35

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

44

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 0.5 1/2 3/4 1

R. 3 W. R. 2 W.

T. 2 S.

365 000 FEET

1 165 000 FEET

350 000 FEET

(Joins sheet 39)

(Joins sheet 43)

(Joins sheet 45)

Russell Branch

McKEE CREEK

Leineke Branch

water

PIKE COUNTY

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45

N

1 MILE

1 KILOMETER

Scale 1:15 840

0 1/4 1/2 3/4 1

0 0.5 1

370 000 FEET

380 000 FEET

165 000 FEET

160 000 FEET

R. 2 W.

T. 2 S.

(Joins sheet 40)

(Joins sheet 44)

(Joins inset A, sheet 35)

ILLINOIS

MORGAN COUNTY

RIVER

PIKE COUNTY

water

26 25 28 27 34 35 36 33

280C2 280D2 274F 274G 937G 279B 430B 280B 937F 19D3 30G 967F 551G 551F 415 428 336 70 71 150 404 30/0